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VOCAL PHYSIOLOGY,

VOCAL CULTURE,

AND

SINGING.

By J. HARRY WHEELER.

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PREFACE.

THE general desire on the part of students of singing, especially those studying with the view of teaching vocal culture, to gain some knowledge of the physiology of the vocal organs, and information relative to voice culture, and singing, has induced me to write this work. For the sake of directness, I have deemed it judicious to present the different subjects, for the most part, in the form of questions and answers.

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Questions in Vocal Physiology.

LARYNGEAL MUSCLES AND CARTILAGES.

1. What is muscle?
2. How many muscles, relative to the voice, compose the larynx?
3. Name the muscles relative to the voice, which compose the larynx.
4. What is a cartilage?
5. How many cartilages compose the larynx?
6. Name the cartilages of the larynx.
7. Where is located the cricoid cartilage?
8. Where are located the arytenoid cartilages?
9. Where is located the thyroid cartilage?
10. Where is located the epiglottis?
11. Where are located the cartilages of santorini?
12. Where are located the cartilages of wrisberg?
13. Where is located the crico-thyroid muscle?
14. Where is located the thyro-arytenoid internus muscle?
15. Where is located the posterior crico-arytenoid muscle?
16. Where is located the lateral crico-arytenoid muscle?

17. Where is located the arytenoid muscle?
18. Where is located the aryteno-epiglottidean muscle?
19. Where is located the thyro-epiglottidean muscle?
20. Where is located the thyro-arytenoid muscle?
21. Where is located the sterno-thyroid muscle?
22. Where is located the thyro-hyoid muscle?
23. Where is located the sterno-hyoid muscle?
24. Where is located the omo-hyoid muscle?
25. Where is located the mylo-hyoid muscle?
26. Where is located the stylo-hyoid muscle?
27. Where is located the digastric muscle?

ACTION OF THE LARYNGEAL MUSCLES.

1. State the action of the sterno-thyroid muscle.
2. State the action of the crico-thyroid muscle.
3. State the action of the thyro-arytenoid internus muscle.
4. State the action of the posterior crico-arytenoid muscles.
5. State the action of the lateral crico-arytenoid muscles.
6. State the action of the thyro-arytenoid muscles.
7. State the action of the thyro-hyoid muscles.
8. State the action of the aryteno-epiglottidean muscles.
9. State the action of the thyro-epiglottidean muscles.
10. State the action of the sterno-hyoid muscle.

11. State the action of the omo-hyoid muscles.
12. State the action of the mylo-hyoid muscle.
13. State the action of the stylo-hyoid muscle.
14. State the action of the digastric muscle.
15. What muscles cause the vocal cords to become tense?
16. What muscles cause the vocal cords to become relaxed?

NERVOUS SYSTEM.

1. What is the prominent distinction respecting the different nerves?
2. Explain the difference.
3. How many cranial nerves are there?
4. Which is the most important nerve concerned in vocal culture?
5. How many portions has the most important nerve?
6. Name them.
7. State their relation to vocal culture.
8. Name the nerves which supply the muscles of the larynx.
9. Where do they arise?
10. Which is the afferent nerve?
11. Name the motor nerve of the crico-thyroid muscle.
12. Name the efferent or motor nerve, to the other muscles of the larynx.
13. Name the motor nerves of respiration.
14. Where does the phrenic nerve arise?
15. What does it supply?

16. Where do the intercostal nerves arise?

17. What muscles do they supply?

18. Name the muscles the long thoracic nerve supplies.

19. Name the muscles the spinal accessory nerves supply.

20. What relation do the spinal accessory nerves bear to the glottis and vocal chords?

21. Name the afferent nerves of inspiration.

22. Of what does the sympathetic nervous system consist?

23. Where do the cutaneous nerves of the face arise?

24. What nerve controls facial expression?

25. How many portions has the seventh cranial nerve?

26. Where does the fifth cranial nerve arise?

27. How many branches has the fifth cranial nerve, and what do they supply?

28. Is the fifth cranial a small or a large nerve?

29. Name the expiratory nerves.

30. What is the effect of exciting these nerves?

31. What effect has sneezing and coughing upon the voice?

32. What is the effect upon the voice, when the nervous system is weakened?

33. Explain respiration, based upon its nervous action.

RESPIRATION.

1. Name the air tubes and where they are distributed.

2. Explain the composition and construction of the air tubes.

3. Explain the lungs, their color, weight, residual air, vital capacity, air cells, etc.

4. Name the principal muscles of respiration.

5. Describe the diaphragm.

6. How many modes of breathing are there in general use?

7. Explain the different modes of breathing.

8. Which mode is the most healthful, and the most useful to singer or speaker?

9. What is the primary motive power of respiration?

10. Is breathing a voluntary, or involuntary action?

11. Explain the action of the muscles of respiration during inspiration.

12. Explain the action of the muscles of respiration during expiration.

13. Describe the action of the muscles of respiration, for the production of the crescendo.

14. Describe the action of the muscles of respiration, for the production of the diminuendo.

15. Describe the action of the muscles of respiration, for the production of the explosive tone.

16. When too much breath escapes during the production of a tone, how may the fault be remedied?

17. Describe the stroke of the glottis.

18. About how many times do the muscles of respiration act in a minute?

REGISTERS OF THE VOICE.

1. How many registers exist in the female voice?
2. What are these registers termed?
3. How high should the first register be carried in different female voices?
4. How high should the medium register be carried in different female voices?
5. Upon what pitch should the third register begin in different female voices?
6. How many registers has the male voice?
7. What are these registers termed?
8. How high should the first register be carried?
9. At what pitch can the second register be introduced?
10. What are the principal muscles weakened by the exaggeration of the registers?
11. State the action of the muscles, and appearance of the vocal cords, when a change in the register occurs.
12. State the appearance of the vocal cords during the production of the low tones.
13. State the appearance of the vocal cords during the production of the high tones.
14. Describe the action of the muscles in ascending or descending a register.
15. What is brought into action when the registers are forced beyond their proper limits?

16. What nerves are weakened by a forced action of respiration ?

VOCAL CULTURE.

1. What is the distinguishing difference between soprano, mezzo-soprano, and contralto voices ?

2. What is the distinguishing difference between tenor, baritone, and bass voices ?

3. Name the usual compass of each kind of voice.

4. In which timbre should the voice be cultivated ?

5. Where should the air be projected, during the production of tone ?

6. What vowels are the most favorable for the production of the dental tones ?

7. What should be the position of the tongue for the different vowels ?

8. What vowels are the most favorable for the production of the sombre tones ?

9. What vowels are the most favorable for the production of the clear tones ?

10. What vowels and syllables are the most favorable for the culture of the male voice ?

11. What vowels and syllables are the most favorable for the culture of the different registers of the female voice ?

12. Which part of the female voice should be cultivated first ?

13. What causes throaty tones ?

14. How may throaty tones be cured ?

15. When the chin protrudes during the singing, how may the fault be remedied ?

16. What is the physiological cause of singing out of tune?

17. What course should be pursued in case one sings out of tune?

18. What is the relation of the epiglottis to the voice;

19. Explain the effect of the action of the epiglottis upon the tones of the voice.

20. When a tone is produced fortissimo in singing, what prevents the tone becoming sharp?

21. Explain the action of the false vocal cords during the production of tone.

22. How long should a person practise daily?

23. How long should a person practise at one time?

RESONANCE.

1. Name the principal points of vocal resonance.

2. Where is the principal resonance during the production of the low tones of the voice?

3. Where are the principal points of resonance during the production of the high tones of the voice?

4. Where should the air be directed for the production of clear tones?

5. Where should the air be directed for the production of sombre tones?

SCHOOLS OF VOCAL CULTURE.*

1. Describe the Italian school of vocal culture.

2. Describe the French school of vocal culture.

3. Describe the German school of vocal culture.

---

* By reading the article on *schools of vocal culture*, one will be prepared to answer these interrogations.

4. How many registers in the female voice are cultivated in the Italian school of vocal culture?

5. How is treated the chest register of the female voice in the Italian school of vocal culture?

6. How is treated the medium register of the female voice in the Italian school of vocal culture?

7. How is treated the head register of the female voice in the Italian school of vocal culture?

8. How many registers in the male voice are cultivated in the Italian school of vocal culture?

9. What is the quality of voice cultivated in the Italian school of vocal culture?

10. What are the physical results of the study of the Italian school of vocal culture?

11. How many registers in the female voice are cultivated in the French school of vocal culture?

12. How is treated the chest register of the female voice in the French school of vocal culture?

13. How is treated the medium register of the female voice in the French school of vocal culture?

14. How is treated the head register of the female voice in the French school of vocal culture?

15. How many registers in the male voice are cultivated in the French school of vocal culture?

16. What is the quality of voice cultivated in the French school of vocal culture?

17. What are the physical results of study in the French school of vocal culture?

18. How many registers in the female voice are cultivated in the German school of vocal culture?

19. How is treated the chest register of the female voice in the German school of vocal culture?

20. How is treated the medium register of the female voice in the German school of vocal culture?

21. How is treated the head register of the female voice in the German school of vocal culture?

22. How many registers in the male voice are cultivated in the German school of vocal culture?

23. What is the quality of voice cultivated in the German school of vocal culture?

24. What are the physical results of study in the German school of vocal culture?

ÆSTHETICS.

1. Define æsthetics.

2. Can all cultivate an æsthetical nature?

3. How may one cultivate an æsthetical nature?

4. Explain its importance in the culture of a musical nature.

5. When words and music are light and cheerful, what should be the quality of tone, and the facial expression?

6. When words and music are sombre and sad, what should be the quality of tone, and the facial expression?

VOCAL PHYSIOLOGY.

Laryngeal Muscles and Cartilages.

1. *A muscle* consists of a soft, red, fibrous substance, of which there are about four hundred on the human body.

2. Eight muscles compose the larynx, *viz:*

3. The crico-thyroid, sterno-thyroid, posterior crico-arytenoid, arytenoid, thyro-arytenoideus internus, thyro-arytenoid, thyro-hyoid, lateral crico-arytenoid. These muscles are connected with laryngeal cartilages (cartilages of the larynx), and exist in pairs, with one exception.

4. *A cartilage* is a tough, elastic, gristly substance. In old age the cartilages of the larynx become more or less ossified, thus impairing the vocal resonance, and lessening the ability to control the tension of the vocal cords.

5. The cartilages which constitute the basis of the larynx are four in number, *viz:*

6. The *cricoid, thyroid,* and the two *artyenoids.* There are other cartilages in immediate proximity to

the larynx, which, in various degrees, have to do with vocalization, *viz:* the *epiglottis*, cartilages of *Santorini*, and the cartilages of *Wrisberg*.

7. *The cricoid cartilage* is the first ring above the trachea or wind-pipe. It is the largest ring of the trachea, and forms the base or lower part of the laryngeal organ.

8. *The arytenoid cartilages* are on the summits of the posterior borders of the cricoid cartilages. The arytenoid cartilages are pyramidal in form, and situated near each other, to the anterior tips of which, are attached the vocal cords.

9. *The thyroid cartilage* rests upon the fore part of the cricoid cartilage, and is the largest cartilage of the larynx. It consists of two broad cartilaginous wings or plates, united at an acute angle in front, where it forms a projection termed *pomum Adami*, or Adam's apple.

10. *The epiglottis* is situated back of the tongue. It is leaf-like in shape, and in swallowing and singing, bears an important relation.

11. *The cartilages of Santorini* are placed upon the summits of the arytenoid cartilages.

12. The lateral or side borders of the epiglottis are free at the upper part, but lower down runs a fold of mucous membrane, joining the summits of the arytenoid cartilages, called the glosso-epiglottidean fold. In these folds are found two small coniform cartilages, termed the cartilages of *Wrisberg*.

13. *The crico-thyroid muscle* arises from the side of the outward part of the cricoid cartilage, passing back-

wards, spreads out into a fan-like shape upon the lower part of the thyroid cartilage.

14. The *thyro-arytenoid muscle* internus arises from the angle of the thyroid cartilage, and is the inner part of the thyro-arytenoid muscle.

15. *The posterior crico-arytenoid muscle* arises from the back part of the outside of the cricoid cartilage, passing upwards, is inserted into the outer angle of the base of the arytenoid cartilages.

16. *The lateral crico-arytenoid* muscle arises from the side of the cricoid cartilage, passing backward and upward, and is inserted into the lateral process of the arytenoid cartilage.

17. The *arytenoid* is a single muscle, located at the posterior part of the larynx, and passes from one arytenoid cartilage to the other, connecting them.

18. The *aryteno-epiglottidean* muscles arise from the lower part of the back of the arytenoid cartilages, passing to the upper part of the opposite arytenoid cartilage, and cross each other like a pair of scissors.

19. The *thyro-epiglottideus* is of two parts, major and minor, and arises internally from the fore part of the thyroid cartilage, and is inserted into the side of the epiglottis ; the first or major part, passes outside the saccule of the larynx, the second or minor part, passes up and is attached to the epiglottis, on each side of the cushion.

20. The *thyro-arytenoid muscles* are on the outer side of each vocal cord, and lie parallel with them, and extend from the angle of the thyroid cartilage to the base of the corresponding arytenoid cartilage.

21. The ***sterno-thyroid muscle*** arises from the sternum or breast-bone, and is inserted into the side of the thyroid cartilage.

22. The ***thyro-hyoid muscle*** arises from the hyoid bone, and is inserted into the side of the thyroid cartilage. The hyoid bone is in the upper part of the throat, and being connected with the tongue, it is sometimes termed the tongue-bone. It plays an important part in the tones of the voice.

23. The ***sterno-hyoid muscle*** arises from the top of the sternum, and is inserted into the hyoid bone.

24. The ***omo-hyoid muscle*** arises from the upper edge of the scapula or shoulder-blade, near the outer angle, and is inserted into the hyoid bone.

25. The ***mylo-hyoid muscle*** arises from the lower edge of the lower maxillary or jaw-bone, and is inserted into the hyoid bone.

26. The ***stylo-hyoid muscle*** arises from the styloid process of the skull, which is just back of where the lower jaw hinges, and is inserted into the hyoid bone.

27. *The digastric muscle* arises from the mastoid process, which is back and above the temporal bone. It is a double muscle and has two attachments, *viz:* at the hyoid bone and at the point of the chin. There is no fault more common with singers than that of making rigid the muscles connected with the lower jaw, especially the temporal muscles, which have their rise at the parietal, or side bones of the skull, and are attached to the jaw, the muscles of which are often made very tense. This fault may be remedied by a backward and downward movement of the jaw, without sound,

striving to relax the muscles which control the action of the lower jaw. The same movement, with the production of sound, using the syllable *ah*, will be found to be of great value in its remedial effects. Persons having this fault, exhibit its peculiarities more conspicuously on the higher tones of the voice, and in pronouncing words in which the *e* sound is made prominent, as *e* in *fear* or *near*. Placing the chin back, and raising the upper lip as in smiling, with the end of the tongue placed at the base of the lower teeth, at the same time producing sound, will also be found to be of great aid in conquering this great obstruction to purity of tone.

Action of the Laryngeal Muscles.

1. The action of the *sterno-thyroid* muscle is to draw down the *thyroid* cartilage, thus stretching the vocal cords and producing a higher tone.

2. The contraction of the *crico-thyroid* muscle draws the thyroid cartilage forward and downward upon the cricoid cartilage, lengthening and rendering more tense the vocal cords, by which means a higher tone is produced.

3. The action of the *thyro-arytenoid internus* muscle is to render straight and tense the *edges* of the vocal cords. The *thyro-arytenoid internus* muscle is the inner part of the *thyro-arytenoid* muscle, when the thyroid and arytenoid cartilages are held in place by other muscles, thereby fixing the length of the vocal cords, the fibres of the *thyro-arytenoid internus* contract, and by their contraction cause tenseness of the vocal cords, resulting in a higher tone.

4. The action of the *posterior crico-arytenoid* muscles, when acting independently, is to draw backward and downward the outer angles of the arytenoid cartilages, to which cartilages the posterior part of the vocal cords are attached. This independent action separates the vocal cords, and relaxes them, but when the arytenoid cartilages are held together by means of

the *arytenoid* muscle, they stretch the vocal cords, the arytenoid cartilages being drawn backward. The arytenoid cartilages work upon about the same principle as a ball and socket joint, they can be moved backward and from side to side.

5. The action of the *lateral crico-arytenoid* muscles is to draw forward the sides of the arytenoid cartilages. This action pulls inward the arytenoid cartilages, and as one end of the vocal cords is fastened to these cartilages, this inward action necessarily approximates the cords. When the *posterior crico-arytenoid* muscles cease stretching the vocal cords, the *lateral crico-arytenoid* muscles pull the apex of the thyroid cartilage and arytenoid-cartilages together, thus relaxing the vocal cords.

6. The action of the *thyro-arytenoid* muscles is to rotate the fore part of the thyroid cartilage upward. This rotary action causes a relaxation of the vocal cords.

7. The action of the *thyro-hyoid* muscles is to pull up the thyroid cartilage, and thus aid the thyro-arytenoid muscles in relaxing the vocal cords.

8. The action of the *aryteno-epiglottidean* muscles is to draw the arytenoid cartilages together and forward, it also draws the epiglottis downward and backward.

9. The action of the *thyro-epiglottidean* muscles is to pull the epiglottis over the vocal cords, covering the glottis, (the space between the vocal cords) thus preventing food or liquids from passing down the trachea or windpipe. The *aryteno-epiglottidean* and *thyro-epiglottidean* muscles are very important in regard to

modifying the quality of the voice. These muscles, by pulling the epiglottis over the glottis, cause the tones to become more sombre.

10. The action of the *sterno-hyoid* muscle is to pull down the hyoid bone, by which action it aids indirectly in stretching the vocal cords. When a high tone is produced, this muscle acts with the *sterno-thyroid* muscle in forcing the thyroid cartilage downward, which action necessarily stretches the vocal cords.

11. The action of the *omo-hyoid* muscles is to act indirectly as stretchers of the vocal cords, as they force the hyoid bone down upon the thyoid cartilage, and the thyroid cartilage being forced down, stretch the vocal cords.

12. The action of the *mylo-hyoid* muscle is to draw the hyoid bone upward. The hyoid bone and larynx are connected by a membrane. The tongue rests upon this muscle, and if this muscle draws the hyoid bone too high, it must of necessity pull up the larynx, and also force upward the tongue, thus causing throaty tones.

13. The action of the *stylo-hyoid* muscle is also to draw the hyoid bone upward, and if to excess, it must pull up the larynx, force upward the tongue, and thus produce throaty tones.

14. The action of the *digastric* muscle is to draw the hyoid bone upward, and the result will be the same, if the hyoid bone be drawn too high, as in the case of the *mylo-hyoid* and *stylo-hyoid* muscles. When there is excess of tension in these muscles, the tension may be offset by a more vigorous action of the *sterno-*

hyoid, *sterno-thyroid* and *omo-hyoid* muscles, which pull the thyro-hyoid bone down. This may be gained by singing the scales with the chin placed down and back, for a few days. If the case be an obstinate one, it will require a longer time.

15. The muscles which cause the vocal cords to become tense, are the *sterno-hyoid*, the *crico-thyroid*, the *thyro-arytenoid internus*, and the *posterior crico-arytenoid* muscles.

16. The muscles which cause the vocal cords to become relaxed, are the *thyro-arytenoid*, the *thyro-hyoid* the *lateral crico-arytenoid*, and the *arytenoid* muscle.

The Nervous System.

1. The prominent difference between the nerves of the body is, that some are sensory, or nerves of impression, and some are motorial, or nerves of motion.

2. Nerves which control the action of the muscles are termed motor nerves, and possess the power of contracting the muscles to which they are connected. The nerves which supply the integument or covering of the muscles, are termed sensory nerves. The sensory nerves convey impressions of *pleasure* and *pain*, and the motor nerves act in obedience to the impressions given by the sensory nerves. For instance, if the hand be held over a fire, the *sensory* nerves would convey the impression of pain to the brain, and immediately the *motorial* nerve would obey the mandate of the *sensory* nerve, and the hand would be removed. If the *motor* nerves be paralyzed, the hand could not be removed, but would burn, causing the most intense suffering. If the *sensory* nerve be paralyzed, the hand could be held over the flame until burnt to a crisp, without the least pain being experienced.

3. There are two sets of nerves, *viz:* the *cranial* and *spinal* nerves; the *cranial* nerves control the mus-

cles of the larynx, both as regards sensation and motion. The cranial nerves consist of nine pairs.

4. The most important nerve in vocal culture is the *eighth cranial* nerve.

5. This most important nerve has three portions.

6. The first portion is termed the *glosso-pharyngeal* nerve, the second is termed the *pneumogastric nerve*, and the third is termed the *spinal-accessory* nerve.

7. The *glosso-pharyngeal nerve*, which is the smaller of the three portions, partly supplies, among other parts, the muscles of the pharynx and gives out branches to the tonsils, and muscles of the palate.

The *pneumogastric nerve*, the larger portion of the eighth pair, is also called the vagus or wandering nerve, on account of the great distance to which its branches extend; it supplies the lungs and stomach, it also supplies branches to the muscles and lining membrane of the pharynx, the same to the larynx, and the lining membrane and muscular fibres of the windpipe; it also furnishes branches to the heart.

The third portion of the eighth pair is the *spinal-accessory*, which takes its rise low in the neck from the lateral columns of the spinal cord, hence the term *spinal accessory*. It supplies the *sterno-mastoid* and *trapezius* muscles.

8. The muscles of the larynx are supplied by the *superior* and *inferior* laryngeal nerves.

9. These nerves are branches of the pneumogastric nerve.

10. The superior or laryngeal nerve is the *afferent* or *sensory* nerve.

11. The *superior laryngeal nerve* also supplies motor nerves to the *crico-thyroid* muscle, and partly to the arytenoid muscle.

12. The *inferior laryngeal nerve* is the *efferent* or *motor* nerve of all the other muscles of the larynx. If any accident should happen to the *inferior-laryngeal* nerve, paralysis of the muscles of the larynx would be the consequence, with the exception of the *crico-thyroid.* This last-named muscle, it will be remembered, is supplied by the *superior* laryngeal nerve. The sensibility of the mucous membrane lining the air passages, is not affected by any injury to the *inferior*-laryngeal nerve, as it is supplied by the *superior* laryngeal nerve; but if the *superior* laryngeal nerve is impaired, then there is a total loss of sensibility in these parts. In other words, the sundering of the *inferior* laryngeal nerve destroys all motion of the muscles of the larynx, with the exception of the *crico-thyroid,* but will not affect the *sensibility* of the larynx. The cutting of the *superior* nerve destroys all sensibility, but will not affect the action of the muscles of the larynx, excepting the *crico-thyroid,* which it supplies with motor nerves, and also the *arytenoid,* which it partly supplies. As in all other parts of the body, so it is with the larynx, *sensibility* may be gone and motion left unimpaired; or *motion* may be destroyed and sensibility left unimpaired. It is very injurious to sing too high or too long, as both nerves become so affected that much harm to the voice is often the result, the muscles are strained and the nerves weakened, which sometimes results in *partial* or *total* loss of the voice. This is

apt to be the case when a register, especially the chest register of the female voice, has been carried beyond its proper limits. Great care should be exercised in these respects by all who would save their voice.

13. The *efferent* or *motor* nerves of *respiration* are the *phrenic* nerves, the *intercostal* nerves, the *long thoracic* nerve, and the *spinal*-accessory nerves.

14. The *phrenic* nerve arises from the cervical (neck) nerves.

15. These nerves supply the muscular fibres of the diaphragm.

16. The *intercostal nerves* are given off from the *dorsal* nerves. The *dorsal* nerves are *spinal* nerves, which come in the following order: *cervical, dorsal, lumbar, sacral* and *coccygeal* nerves.

17. The *intercostal* nerves supply the intercostal muscles. These important muscles are those passing up and down from one rib to the other. It will be remembered that the ribs rise and fall during respiration, and it is these nerves which give life and strength to these muscles.

18. The *long thoracic* nerves supply the serrati muscles. In deep inspiration these muscles come into action. They are situated on each side of the back of the chest.

The *superior posterior serratus* muscle, which is an auxiliary inspiratory muscle, arises from the three lower *cervical* (neck) vertebra (bones of the spinal column) and is inserted into the second, third and fourth ribs, on both sides of the chest. It raises these ribs, and as the ribs are all connected, tend to raise

all the others. The *inferior posterior serratus*, an expiratory muscle, arises from the lumbar vertebrae (just below the waist) and passing forward and upward is inserted into the ends of the tenth, eleventh and twelfth ribs. It brings the ribs downward.

19. The *spinal accessory* nerves supply the *serratus* and *trapezii* muscles; these last named muscles are auxiliary muscles of respiration.

20. The *spinal-accessory* nerves govern the opening and closing of the glottis, (the space between the vocal cords) and the tension of the vocal cords.

21. The afferent (or excitor) nerves of inspiration are the *pulmonary* (relating to the lungs) branches of the pneumogastric, (the second portion of the eighth cranial nerve) and sympathetic. All the cutaneous nerves are excitor nerves of inspiration.

22. The *sympathetic* system of nerves consist of a set of nerves located on either side of the spinal column, from the neck to the pelvis. They are connected with the other nerves and are in sympathy with them. They are excitor and motor.

23. The *cutaneous nerves* (or nerves of the skin), arise from the fifth pair of cranial nerves. The fifth pair of cranial nerves give out the sensations to the facial muscles. It has also some motor filaments. The respiratory movements are reflex. Respiration having once begun, the need for breath, given out by the *sensory* nerves, impels the *motor* nerves of respiration to act, and this *excitor motor* movement is kept up from birth to the end of life. The *cutaneous* nerves of the whole body are excitor nerves of

inspiration. It is said that the first act of inspiration at birth is induced by the stimulus of cold acting upon the cutaneous nerves. Cold water dashed upon the warm parts of the body, will induce sudden inspiration in the case of one who has fainted.

24. *Facial expression* is controlled by one portion of the seventh pair of cranial nerves, also branches of the third portion of the fifth cranial nerve supply a few muscles of the face.

25. The seventh cranial nerve has two portions termed the *portio-mollis* and *portio-dura.* The first is the *auditory* nerve or nerve of hearing; the second supplies the facial muscles and other neighboring muscles. The seventh pair of nerves have their rise at the *medulla-oblongata.* The *medulla-oblongata* is situated in the head, and is the upper portion and continuation of the spinal cord, and through it all sensory impressions are transmitted to the brain.

26. The fifth cranial nerve has its rise from the sides of the *pons-varolii.* The *pons* (bridge) is situated in the head, just above the *medulla-oblongata.* It is a mass of nervous matter crossing from side to side.

27. The fifth, as has been stated, is a *sensory* nerve. It has three branches. The third only supplies motor branches to a few muscles of the face, but all three of the divisions of this nerve supply, among other parts, the afferent or sensory nerves to the muscles of the face, head, forehead, teeth and gums.

28. The fifth cranial nerve is the largest of the cranial nerves.

29. The *expiratory* nerves are the nasal nerves, and the laryngeal branches of the pneumogastric.

30. The effect of exciting these nerves is to cause sneezing, coughing, etc.

31. The effect of sneezing or coughing upon the voice is to cause hoarseness. The singer should do all in his or her power to avoid this, as well as laughing aloud or singing and speaking explosively, all of which cause a dryness of the mucous membrane, resulting in hoarseness.

32. When the nervous system is weakened from any cause, the voice loses power and brilliancy.

33. If the nerves supplying the muscles of respiration, for example, should become exhausted from any cause, respiration would be impeded, hence a lessening of vocal power. If one has weakened the spinal nerves by too much lifting, walking, or from any cause they have become debilitated, in proportion to the debility, will be the loss of respiratory activity. Loss of voice is often caused by physical weakness. Singers should avoid going up and down several flights of stairs daily. Few ladies can sing successfully who do this. Long fatiguing walks should also be avoided. Deep sorrow affects the voice, as it has a depressing effect upon the nerves. The nerves of the body, sensory and motorial, are so interwoven that one cannot be impaired without affecting the other. When one is in poor voice, it does not necessarily mean that the voice has been used injudiciously, or that it is affected by a cold. It may mean nervous prostration in some part of the body. In such a case a tonic would be more beneficial than a singing lesson. In fact, a singing lesson would only make

matters worse, as it would only add to the weakening process. For instance, if there be any disease of the recurrent laryngeal nerve, the larger number of the laryngeal muscles will lose their power, as most of them are supplied by this nerve. If one sings too long, or too high, the nerves supplying the laryngeal muscles will become exhausted to such an extent, that they will fail to give strength to these muscles, hence there will be a depression from the pitch; and if too much nervous vigor be communicated to the voice, the result will be an elevation of the pitch. In many cases where the nerves have been overtaxed by too high or too powerful singing, the voice never regains its normal condition. The tremulo is often caused by this. It should be remembered that the life and strength of all muscles depend upon the strength of the nerves; and when these are weakened from any cause, good singing is an impossibility. The singer needs rest and quiet, and must be in a better physical condition than those engaged in any other branch of the profession. Singers should sleep as much as possible, and retire at an early hour. If musical engagements necessitate late hours, then sleep should be obtained during the day. The singer should never become weary, mentally or physically. In order to sing well, the mind, as well as the body, must be in a perfectly healthy condition. If these conditions are complied with, one possessing a good voice, and genius, may reasonably expect a successful musical career.

Respiration.

There is no branch of vocal culture so much neglected as that of respiration. The subject of breathing should be treated at the first lesson, and dwelt upon until the respiration is perfect. Steadiness, duration, breadth, quality and power of tone, are in the main dependent upon a proper mode of using the breath. Constant singing or speaking, with an incorrect method of breathing, is often the cause of enfeebled health and an impaired voice, while a correct mode builds up the health and improves the voice. By means of proper gymnastic exercises, the chest may be made to expand several inches, thus giving more room for the growth of the lungs, and deeper inspirations. No one should dress tightly, for under such conditions it is utterly impossible to expand the chest, hence there can be no growth of the lungs. Women usually breathe from the upper lobes of the lungs, on account of their manner of dressing, while men breathe deeper, being more loosely dressed. All respiration should be diaphragmatic, or, in other words, abdominal; the abdomen rising and falling with each respiration. Any course different from this is detrimental, and often causes great fatigue during singing. After the

lungs have been once inflated, as in the beginning of life, they never, except from disease, or decay, become entirely emptied of air. The air thus retained is termed the *residual* air. It is utterly impossible to exhaust all the air from the lungs. The quantity of air which can be expelled after the deepest inspiration, is termed the *vital capacity* of the chest, as it shows the amount of air under control of the respiratory organs. The *vital capacity* is of great consideration, indicating as it does, the power of the respiratory organs, and the health of the lungs. The air inspired and expired at each ordinary respiratory act, is termed the *breathing*, or *tidal* air. The movements of inspiration and expiration, constituting a complete act of respiration, is called the *rhythm* of respiration.

The *external intercostal* muscles *raise* the ribs, and the *internal intercostal* muscles *lower* the ribs. These muscles are attached to the ribs, passing from one to the other. The *externals* pass downward and forward. *The internals* pass downward and backward. In *inspiration*, the *externals* are employed, and in *expiration* the *internals* are employed. The air enters through the *nostrils*, or through the mouth, into the *pharynx*, and thence through the *larynx*, *wind-pipe*, and its sub-divisions, into the lungs; it is *expelled* through the *same air passages*. The former act is termed *inspiration*, the latter, *expiration*, both acts constituting what is called, *respiration*.

1. The ***nose***, ***pharynx***, ***larynx***, ***trachea*** or ***windpipe***, and ***bronchi***, are the air passages of respiration.

2. The ***nose*** has two apertures opening into the pharynx, which, being bony, facilitates the ingress and egress of air. The ***pharynx*** is at the back part of the mouth. It is a muscular-membraneous sac. The ***larynx*** is a muscular and cartilaginous organ, and has already been explained under the head of Laryngeal Muscles and Cartilages. The ***trachea*** divides into two small air tubes, termed the bronchi, one for each lung.

The ***trachea*** is about four and a half inches in length, and from three-quarters to one inch in width ; it is wider in the male than in the female. The ***trachea*** is composed of from sixteen to twenty cartilaginous rings, round in front and flat behind. The right bronchus (bronchi being the plural of bronchus) is about one inch in length, and enters the root of the right lung. The left ***bronchus*** is about twice the length of the right, but less in diameter. It enters the root of the left lung. The structure of the bronchi is similar to that of the ***trachea;*** convex at the front and sides, and flat behind. The rings, however, are smaller than those of the ***trachea.*** The right ***bronchus*** has from six to eight, and the left from nine to twelve rings.

3. The lungs are two in number. They are porous, spongy, elastic organs, and are situated in the cavities of the thorax or chest. The lungs are composed of five lobes, the left having two, and the right three lobes. In some cases the number of lobes vary from this. Each lobe has a large number of divisions,

called lobules. Each lobule is composed of many air cells. The bronchi, after entering the lungs, become sub-divided into smaller tubes, each sub-division or tube opening into each lobule. The air cells of each lobule communicate with each other, but the air cells of different lobules do not. The weight of the lungs depends in a great measure upon their inflation. The two lungs weigh about forty-two ounces; the right lung weighing about twenty-two and the left about twenty ounces. The lungs are larger in the male than in the female. The color of the lungs in infancy are of a pinkish white, but grow darker as age increases, becoming mottled, with dark spots; in old age they are sometimes even black. It has been calculated that the number of air cells in both lungs, is about 6,000,000. The lungs are supplied with nerves, absorbents, and blood-vessels.

4. There are several muscles employed in the act of respiration. The principal ones are the *diaphragm*, the *external* and *internal* intercostal muscles, the *anterior* and *posterior scaleni* muscles, the *posterior superior* and *inferior serrati* muscles, the *great serratus* muscles, also the abdominal muscles, viz.: the *oblique descendens externus*, the *oblique ascendens internus*, the *transversalis abdominis* and the *rectus abdominis*. The *oblique descendens externus* muscle arises from the extremities of the eight lower ribs, and passes obliquely downward to the middle part of the abdomen, (*linea alba*).

The *transversalis abdominis* arises from the middle of the back, and the ends of the false ribs, and passes

around the abdomen, and is inserted into the linea alba.

The *rectus abdominis* muscle arises from the breast-bone and descends vertically to the pelvis. These abdominal muscles compress the abdomen, and thus cause the viscera of the abdomen to ascend, by which means the *diaphragm* is forced upward. When the diaphragm descends these muscles relax, allowing the viscera to descend. The *levators* of the ribs assist in elevating the back part of the ribs, and slightly rotate them outward. The diameter of the chest is thus increased.

The *anterior* and *posterior scaleni* muscles descend on each side from the *cervical* vertebræ, (or bones of the backbone at the neck), to the first and second ribs, and aid in a great measure in elevating those ribs. The *posterior superior serrati* muscles are found at the back of the chest, and are attached to certain of the upper ribs, and by their contraction, raise those ribs during inspiration.

The *great serrati* muscles are large muscles which pass from the lower part of each scapula, (or shoulder-blade), over the sides of the chest, connecting the eight upper ribs, raising them and forcing them outward, thus aiding in expanding the chest during inspiration.

5. The *diaphragm* is a muscular and tendinous vaulted, or arched partition, separating the parts contained in the chest, from the parts contained in the abdomen. The diaphragm is attached to the spine, the ends of the seventh and succeeding ribs and also

the lower extremities of the sternum, (or breastbone). It has the power of contracting its muscular fibres, thus depressing to quite an extent the arch to a level surface, thereby increasing the vertical cavity of the chest.

6, 7. There are two modes of breathing, viz.: the *diaphragmatic*, *abdominal* or *inferior costal*, and the *superior* costal respiration. The first is that generally used by men and children; the second is the typical form of breathing by women, and is mainly performed by the action of the ribs, caused by tight dressing. In abdominal or diaphragmatic breathing, the diaphragm falls to a great extent, while in superior costal breathing the diaphragm falls but slightly. Respiration should be the same in both sexes. If women dress loosely there is no reason why they should breathe differently from men during vocalization. Women who wear corsets tightly drawn about the waist, especially "abdominal corsets," and others which are long in front, force downward and inward the viscera or contents of the abdomen to such an extent, that weaknesses and diseases are brought on, and the free action of the abdominal muscles is impossible; hence, under such baneful conditions, there can be no satisfactory abdominal breathing. The result of breathing entirely from the chest (superior costal breathing) is, that only the upper lobes of the lungs become fully inflated, while the lower ones remain nearly empty of air. The breath cannot be sustained as steadily, and it is an effort to keep the chest elevated, while the deeper breathing causes

little or no effort. Some of the most successful singers of Italy, are pupils of Lamperti, (a man now nearly eighty years of age). All these singers, men and women, use only the abdominal or diaphragmatic breathing. Reference is made to this celebrated teacher of singing, because he is so well known in this country, and is a man of such vast experience. Methodical breathing is too much neglected by teacher and pupil, but lacking in this particular, the pupil will fail in all things. Phrasing, the crescendo, the diminuendo, the forte and piano passages, as well as the trill, and general agility of the voice, are all dependent upon a correct, and systematic mode of respiration.

8. The most useful mode of breathing is the diaphragmatic or abdominal. It gives more ease to one during singing or speaking, facilitates rapidity of execution, and gives smoothness to the portamento or the carrying of the voice. It also enables one to give more force to the explosive tone; it allows space for a deeper vocal resonance, for by the extreme lowering of the diaphragm, as is the case in abdominal breathing, the vertical distance is much augmented. Respiration can better be controlled by means of the abdominal muscles, than by the action of the ribs merely, as in superior costal respiration, the raising of the chest in inspiration and holding it in an elevated position is fatiguing to many, and frail persons find it impossible to sustain a tone for a long time under such conditions. The lungs can be more generally inflated by diaphragmatic breathing; that is, the air can be more generally distributed in the different

lobes of the lungs, especially in the lower lobes. One should practice breathing gymnastics, such as raising and expanding the chest, and when the chest is elevated, pounding the chest, thrusting the arms forward, then suddenly drawing them backward, etc. These exercises will increase the size of the chest, and render the cartilages more mobile, and give one more control over the muscles of respiration. When one is dressed tightly, it will be found impossible to expand the sides, or use the abdominal muscles freely. One of the first requisites of a singer, is good respiration; when this is defective, no singer is at his best. Many artists are very imperfect in respect to their mode of breathing, and are sometimes seen to raise their shoulders in a most awkward manner, while at the same time they may be plainly heard taking their breath. *Natural* respiration is abdominal; superior costal respiration is acquired and is unnatural Boys and girls use abdominal breathing, but as girls change their mode of dress, they change their mode of respiration, but the respiration of boys continues to be abdominal. The abdominal muscles are auxiliary muscles of respiration; several of them are connected with the ribs, and draw them downward and inward.

The action of the abdominal muscles in respiration is a great aid to digestion, as it keeps the viscera moving with each respiration.

9. The primary motive power of respiration at birth, is induced by a reflex action of the nerves, that is, the sensory nerves being influenced by the cold air, the motor nerves or nerves of motion, are compelled to act in obedience to the sensory nerves.

After the reflex action of the nerves have begun in life, there is a constant influence acting upon the sensory nerves, by the disagreeable feeling caused by want of breath. This stimulus causes the motor nerves to act in obedience to the sensory nerves; thus the action of these two sets of nerves are kept up during life, causing inspiration and expiration, which complete one respiratory act. This action is termed the *rhythm* of respiration.

10. *Breathing* is an *in*voluntary action. The breath may be voluntarily suspended for a short time, but the distressing feeling for want of breath, stimulates the motor nerves of respiration to act; thus the muscles of respiration are again set in motion. During sleep we are not conscious of breathing. In some animals, respiration is continued for a short time after decapitation. The whale may remain under water for an hour, also some birds; still, as in the case of a diver, who may in some instances remain under the water for three minutes, the muscles of respiration will resume action independent of the will, necessitated by the suffering feeling for the want of breath.

11. During *inspiration*, the external intercostal muscles, and the posterior serrati muscles, raise the ribs. The *serrati* muscles aid in expanding the sides of the chest. The levators of the ribs also aid in the expansion of the sides of the chest. The diameter of the chest is thus increased, the muscles of the abdomen expand, the diaphragm sinks, thus augmenting the vertical distance of the chest, and giving the lungs greater scope for their inflation.

12. During *expiration*, the internal intercostal muscles, and the inferior serrati muscles, draw the ribs down, thus diminishing the circumference of the chest. The abdominal muscles compress the abdomen, by which means the viscera or contents of the abdomen are forced upward, causing the arch of the diaphragm to ascend. It will be remembered that the diaphragm descends in inspiration, and the abdominal muscles relax to make room for the depressed viscera. In *inspiration* the abdomen moves outward, and in *expiration* the abdomen moves inward. During life this action should be kept up.

13. The *crescendo* is produced by means of the contraction of the abdominal muscles, thus forcing upward the viscera, causing the diaphragm to ascend; the lungs resting upon the diaphragm, as they do at all times, will of necessity be forced upward, thus expelling the air. The internal intercostal muscles draw the ribs downward, thus crowding the sides of the body upon the lungs, and affording another means of forcing the air from the lungs. The inferior serratus muscle also draws the ribs downward, acting upon the lungs, and producing the same result as in the case of the intercostal muscles. The more force there is given to the action of these muscles, the greater will be the crescendo.

14. The *diminuendo* is produced by means of a very gradual relaxation of the abdominal muscles, and a gentle contraction of the inferior intercostal muscles and the inferior serrati muscles. It will be seen that the same muscles which produce the crescendo, also control the *diminuendo.*

15. The *explosive* tone is produced by means of a sudden action of the expiratory muscles.

16. Many persons find it difficult to control the muscles of respiration, in consequence of which the breath escapes with great rapidity through the glottis (the space between the vocal cords), causing the tone to be husky, and the singer to become greatly exhausted. This defect, in all cases, may be remedied by inhaling a moderate amount of air, and singing each note with a soft staccato or stroke of the glottis. The practice of staccato tones upon the different degrees of the staff, five times in succession upon each degree, sustaining the fifth tone, will be found to be of great advantage in remedying the defect. When the first attempts are made to sustain the fifth tone, the breath will escape soon after the tone is taken, but by repeated practice, ability to lengthen the sound will be gained, until finally the expiratory muscles will become so much under the control of the singer, that the most powerful tone can be produced without the slightest escaping of breath.

17. The *stroke of the glottis* is produced by means of a sudden opening of the glottis. The air is first inhaled, and retained for a moment below the vocal cords, when the air, acting upon them abruptly, they suddenly open, producing a sound termed the *stroke of the glottis*. It is made upon precisely the same principle that a sound is produced when the air, having been located between the cheeks, the lips suddenly open for the pronunciation of the word *pur*. Persons having the habit of singing out of tune, often eradicate

the fault by careful practice of the stroke of the glottis. The muscles controlling the vocal cords, however, may not at once obey the will. The brain often conceives the pitch of a tone, but the muscles controlling the vocal cords do not obey the dictates of the mind; hence the cords vary in tension, giving out tones of a varying pitch. When one sings out of tune from this cause, the difficulty can generally be entirely remedied, but when from a defective nerve organization relative to the hearing, it is impossible to fully eradicate it. There are those who can discern the slightest discord, but cannot sing the scale correctly; this proceeds from a physical laryngeal imperfection, or weakness, but as stated, can generally be cured; but when a person cannot notice any difference between a high or low tone, the case may be considered almost hopeless. The practice of the study of the stroke of the glottis, should be carefully pursued by all persons intending to become singers, as it at once places the tones, thus preventing any possible change in the pitch, or quality of the voice; and the muscles are thus educated to instantly obey the will, and the requisite tension of the cords is gained for the pitch of tone desired.

18. The number of inspirations of an adult, is from 17 to 18 per minute; in childhood, they are about 26 per minute, while in the infant at birth, they are as many as 40 to 50 per minute. In old age, the frequency of the respirations are increased. The respirations of woman are more frequent than in man; man breathes deeper.

Registers of the Voice.

There are various opinions relative to the subject of voice registers; some averring that none exist, others that there are two registers in the male voice, and in the female voice three, five, or even more. In the first place, it is well to understand what constitutes a register. Worcester gives it, *a stop.* In the organ, a certain series of tones is termed a register, each change made, forming a different register.

One of the greatest stumbling-blocks to the full comprehension of the subject of registers, is the conflicting element of resonance, which, as a matter of fact, has nothing in common with the subject.

Resonance has only reference to the *quality* of a sound produced by the direction of the air into, or against some resonant body. If resonance is admitted to be a register, then the number of registers are almost innumerable, for the various directions of the air necessarily produce different qualities of tone; hence there would be many, and a great variety of registers. We should then have the pharyngeal, the nasal, the palatal, and the dental registers, etc. A single *register* may have a variety of resonance. Any woman singing the entire compass of her voice, is aware that

at certain points in the voice, sudden breaks occur. The series of tones up to the points of breakage, are most certainly different from the tones which follow. The breaks are made entirely involuntary, and they can only be overcome by systematic vocal study. That there are three different sorts or kinds of tones in the female voice, all must recognize, and the greatest masters of vocal culture of the past and present, term these changes *registers*. Those, however, who, from a theoretical stand-point, concede but one register, must from necessity, acknowledge a natural break or change in the voice at certain places. Any one not recognizing this fact, in the attempt to cultivate the voice, would ruin every voice placed under their guidance. The vocal cords or bands are controlled by certain muscles; the lowest tones of the female voice, up to a certain point, are said to be in the *chest* register. Above this point, up to another point, the tones are said to be in the *medium* or *falsetto* register (which is synonymous); above this point are tones said to be in the *head* register, making three registers or series of tones. As one ascends the scale from the lowest or chest tones upward, the vocal bands become more tense by means of certain laryngeal muscles, and the vibrating length of the cords become shorter At a certain point they suddenly relax, when an abrupt break or change occurs in the voice. After this break, the muscles controlling the vocal cords are in precisely the same condition they were before the break occurred, and the larynx has ascended. From this point, the second series of tones or tones of the medium register

are begun, the muscles acting upon the cords as in the chest register, and when a certain point is reached, the muscles again relax, a break is heard, and the condition of the vocal organs are found to be in precisely the same state they were in before the series or medium tones were begun, and, as in the first instance, the larynx has ascended; then follow tones of the head register, in which no break occurs until the end of the compass of the voice has been reached; the voice then ceases, the vocal cords having exhausted their capabilities. In the chest register, the vocal bands are thick, in the medium register less so, and in the head register still less; hence the vibrating depth being greater in the lower tones, these tones necessarily possess more volume. In investigating the subject of the registers of the voice, several points should be taken into consideration. 1st, the action of the laryngeal muscles, 2d, the thickness of the vocal cords, 3d, the ascension of the larynx. Within the limits of the *chest* register, certain tones of the *medium* register may be sung, and *vice versa;* this is also true of the other registers; one may pass with the same register, into the realm of another, still, the quality of the tones in the various registers are entirely different, for two reasons: first, on account of the difference in the vibrating depth of the cords, and second, on account of the difference in the position of the larynx. We now come back to the consideration of what constitutes a register. A register consists of a series of tones up to a certain point, at which point the muscles relax, the result being a break in the

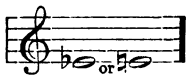
voice. This can consistently be termed a *register.* These facts may be learned by careful laryngoscopic investigations. When the extent of a series of tones has been reached, the muscles rapidly change, and their action is repeated after each change or break in the voice, and the vibrating diameter of the vocal cords will be seen to be less for each register.

1. In the female voice, then, we must acknowledge three registers.

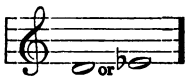
2. These registers are termed chest, medium (or falsetto) and head.

3. There are various opinions in regard to the distance the different registers should be carried, but it will be found more agreeable to the ear, and the voice will longer retain its strength and purity, *not to use the registers to their full extent.*

The chest register of the soprano voice should not exceed E♭ or E♮.

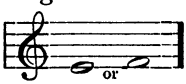


If a soprano voice be very light in quality, it should not exceed D or E♭,



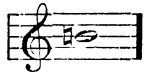
for the reason, that the voice being delicate, chest tones sung above these degrees would impair the voice.

4. The medium register should begin on E or F.

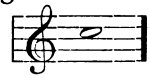


The *quality* of the voice should decide the teacher or singer on which of these letters the medium register

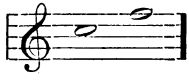
should be begun. The medium register should not be carried higher than B♮.



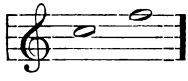
5. The head register should begin on C



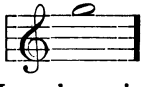
as the head register at this point is more musical in quality than the medium. The voice between C and F



can give out more volume than is possible on the degrees above, and on this account, the distance from C to F



is termed by some, a second head register. There is nothing, however, to warrant such a conclusion, as there is no change in the vocal cords. It is only a change in *resonance*, and not a *muscular* change. The tone *naturally* places itself higher in the head for the G



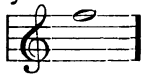
and tones above. Just here is where many teachers make a great mistake, and many fine voices are ruined. The attempt is made to force the same volume up to G and above, that the head tones below *naturally* possess. The volume of the head tones from C to F is caused by the air reverberating to a great extent in

the upper part of the chest, in the pharynx or back part of the mouth, and in the nares or upper part of the nasal passage. The larynx is also quite low. The tones above F vibrate higher in the head, and the larynx is much higher. The higher the tones, the more delicate they should become. Everything animate, and inanimate, bears out this theory. It is so with the birds that sing, and all musical instruments made by man.

6. The male voice has two registers.

7. The first register is termed the chest, and the second the falsetto or head register.

8. Those who recognize two registers in the male voice, generally carry the chest tone to F.



9. The falsetto is then introduced on G.

It is seldom that a fine artist is heard to use the falsetto register, except it be at the beginning or end of a crescendo or diminuendo. Although falsetto tones gain some strength by practice, still they always remain weak and effeminate, and when used on continuous words, produce a contrast between the two registers which is exceedingly disagreeable to listen to. Most singers who use the falsetto voice in singing the high tones, are those who have impaired voices, or who, from lack of a proper method, have not the ability to sing the high chest tones softly and in tune, hence resort to the falsetto tones as a substitute for

the sotto voce chest voice. All the tones of the male voice, except it be at the beginning of a crescendo or the end of a diminuendo, should be in the chest register, and if the voice be properly educated, these tones will last as long as does the body; and the sotto voce or soft chest tones, will pass into the falsetto register without the slightest difficulty, producing the crescendo or diminuendo without a break. When the falsetto tone is used, care should be exercised to use the *same quality* as that of the chest tone.

10. All the muscles which cause the tenseness of the vocal cords, are weakened by the exaggeration of any register, and if the exaggeration is often repeated, the muscles will become so overstrained that the voice will become tremulous, and eventually a mere wreck of what it was. Children's voices, as well as those of adults, are often utterly ruined in this way. In some of the public schools, and Sabbath Schools, the demands of the leader of the music for power is often so persistent, that very many voices are irretrievably broken down, while others retain only the low tones of the voice. Those who have lost the upper tones, are generally able to sing an alto part, but it is never of a full resonant quality, for this quality belongs only to the natural contralto voice, and not to a soprano voice, which from bad usage, is compelled to sing the low tones. We are glad to say, however, that in the public schools of Boston, voices are carefully treated, great care being taken to have the pupils sing in a manner that will tend to strengthen and preserve the voice. The muscles of vocalization need exercise to develop

them, as do the other muscles of the body, and when properly used in childhood, the result is beneficial. When the voice is changing, one should cease *entirely* from singing. The female voice generally changes at about fourteen, and the male voice at about sixteen years of age. Often the change is hardly noticeable in the female voice, while in the male voice the change is always very perceptible. The voice does not become fully settled under two years from the commencement of the change. During this change the larynx, rapidly increases in size, and the vocal cords become longer and stouter. The larynx of woman is much smaller than that of man, the walls of the larynx are also much softer, the apex of the larynx is not as prominent, there is not as much space between the walls of the larynx, the vocal cords are shorter and not as thick, and to this difference in structure, is due in a great degree, the difference in the *quality* of the male and female voice.

*11 12. During the production of the low tones, the vocal cords are loose and thick. It requires more air to cause the cords to vibrate for the production of the low tones than for the high. The vocal cords being relaxed for the production of the low tones, while for the high tones they are tense. The lower the tone, the greater the quantity of air required to cause the cords to audibly vibrate. One often fails in the attempt to produce the low tones of the voice, by not realizing this fact, giving no more force for the production of the low chest tones, than for the upper tones. In passing from the medium register down into the range

*11. The action of the muscles, when a change in the register occurs, is described on page 47.

of the chest register, the tones are apt to be produced in the medium register, unless more air force is given. It is injurious to practice as low as *possible*, for by so doing, certain muscles become overstrained and weakened.

13. During the production of the high tones of the voice, the vocal cords are very tense, and the higher one sings, the shorter they become as the tension increases; the cords have less width, therefore they possess less volume, as far as the vibrating cord affects the volume. If the attempt is made to sing higher than the proper compass of the voice, the muscles will suddenly relax, and cause the voice to break. If this often occurs, the ruination of the voice is inevitable. There is no class of singers so apt to ruin their voices, as are the first tenors of a male chorus, as the part they sing contains so many very high tones. When too much force is given to a high tone, the vocal cords will sometimes strike together, thus producing a break. The break may also be the result of singing any register beyond its natural limits. One should never *practice* the highest tones of the voice. If there is one way to break down the voice more rapid than any other, it is that of continually practicing the highest tones. For instance, if one wished to strengthen the muscles of the back, it would not be wise to lift all that might be possible, for by such a course one would soon weaken, rather than strengthen those muscles. One should lift just enough to cause a slight effort. On the other hand, too little weight would fail to give the muscles the exercise

requisite for the building up of muscular strength. For example, the lifting of a pin would never increase one's strength; so it is with the treatment of the vocal muscles; if too much force is used, the laryngeal muscles will become weakened, and the voice will become impaired. If these muscles are not sufficiently exercised they will remain weak from inactivity, and the voice will fail to acquire its full strength or compass. The *extreme* should never be indulged in; one should practice exercises with a good degree of power, unless there be some especial reason for lighter practice. Many students practice with little, or no vigor or real interest. They seem to think if the exercises are sung, that is sufficient, and the result is, no improvement in power or execution is gained. Students often do not practice properly, they do not practice as they are requested to do by their singing master, they have ideas of their own, and try experiments. This is all wrong; if a pupil would succeed, he should follow *strictly* the suggestions of his teacher. One should never practice singing with the piano facing the wall, for the vibrations meet with such a sudden obstruction, that the attempt to sing causes great fatigue of the laryngeal muscles, and indeed of the whole body. Many rooms are so full of furniture, including carpets and draperies, that the singer finds it impossible to produce good tones, and also experiences much exhaustion. It is better for one to stand when practicing the voice. It gives freedom to respiration, and general bodily ease.

14. In ascending, or descending a register, the muscles act as stated on page 39.

15. When a register is forced beyond its natural limits, the nerves controlling the laryngeal muscles become weakened, and in some cases never regain their normal strength; when such is the case, the voice is irretrievably lost, the tones are tremulous, the voice breaks, and to sing in tune is an impossibility. We see many lamentable examples of ruined voices, by the exaggeration of the registers, in the female serio-comic singers of the theatres. The forcing up of the chest tones is especially hurtful. If continually practiced, as is often the case with female singers in the variety theatres, and opera bouffe, a few months will suffice for the ruination of the middle tones of the voice, and eventually the entire voice will become a perfect wreck.

16. In a forced act of respiration, many nerves are called into play which are not directly connected with the muscles of respiration. By endeavoring to inhale or exhale all the air possible, one finds that many nerves, both sensory and motor, are affected. The motor nerves, however, directly affected, are those in direct connection with the respiratory muscles, viz.: the *phrenic* nerves which supply the diaphragm, the *intercostal* nerves which supply the intercostal muscles, the *long thoracic* which supply the serrati muscles, and the *spinal accessory* nerves which supply the trapezii muscles. The above named nerves are motor nerves, impelled by the sensory nerves. If the respiratory nerves are weakened from any cause, it will be found impossible to breathe with ease; hence it will be found impossible to sing well.

Vocal Culture.

1, 2. The distinguishing difference between all voices, is in the *quality.*

There are several kinds of voices, viz.: In the female voice, soprano, mezzo-soprano, contralto, mezzo-contralto. In the male voice, tenore-leggiero, tenore-robusto, baritone, basso-cantante, basso-profundo. The tenore-leggiero is a light voice; tenore-robusto is a large-voiced tenor.

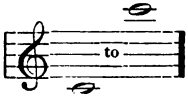
In attempting to cultivate the voice, it is of the greatest importance to ascertain as soon as possible the real character of the voice. Some voices are so warped, the tones so misplaced, the registers and quality so exaggerated, that at first it is sometimes impossible to tell what the voice in its normal condition really is. All voices should not be treated precisely the same. For example, if a voice is a soprano, it should not be treated as though it were a mezzo-contralto, or a tenor as a baritone, even if the compass be the same.

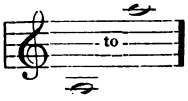
There are but few pure soprano or contralto voices. Many mezzo-soprano voices have as much height as the soprano, and sometimes as much depth as the contralto, but the high tones of the mezzo-soprano, lack the sweetness and brilliancy of the soprano, and the low tones, the volume of the contralto voice. The

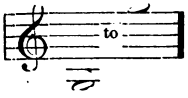
high tones of the contralto are thin and shrill, while those of the soprano are brilliant and flute-like in quality. The high tones of the baritone are full, while those of the tenor, although perhaps of the same compass, are more delicate, and less voluminous.

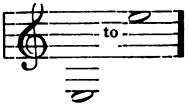
Persons often fail to make themselves singers, on account of choosing to sing a part not fitted to their voices. For example, the mezzo-soprano attempts to sing soprano, or the baritone to sing tenor, and the result is a failure to sing any part well.

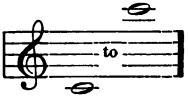
3. The usual available compass of the masses of voices is two octaves, and are as follows: —

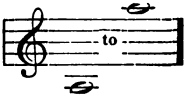
Soprano voices from . . . . . 

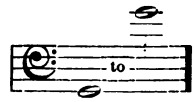
Mezzo-soprano voices from . . . 

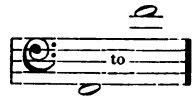
Mezzo-contralto voices from . . . 

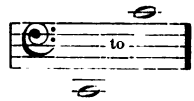
Contralto voices from . . . . . 

Tenore-leggiero voices from . . . 

Tenore-robusto voices from . . . 

Baritone voices from . . . . . 

Basso-cantante voices from . . . 

Basso-profundo voices from . . . 

Many voices exceed these limits in height, and depth of compass, but the tones are generally produced with an effort.

4. The voice should be cultivated in the clear timbre or quality. The strength of the voice is gained in this timbre. It should not be understood that the tone should be of a thin, flat quality; all tones should receive a certain degree of coloring from the first. The sombre timbre should only be used for emotional effects; if the voice has been properly cultivated, it will become stronger and more sombre by usage and age.

5. For the production of clear tones, the air should be directed forward, and for the production of the sombre tones, the air should be directed backward. The quality of a tone is almost entirely due to its resonance. For example, if the main portion of the air be projected into the pharynx, or toward the teeth, the tones will have a pharyngeal, or dental quality, and the same is true in regard to other points of resonance. If there be any obstruction to the resonance,

such as the curling of the tongue, or closing of the nasal passage, the tone will sound throaty or nasal.

6. In cases where the resonance is too far back, the vowels ee, as ee in *deed*, will be found to be the most favorable vowel to bring the resonance forward. Practice with the word *see* will also prove of great advantage. The consonant *s* aids largely in placing the sound well against the teeth; for a clear enunciation of this vowel, the upper lip should be raised, as in smiling, showing the front row of upper teeth.

7. During singing, the position of the tongue for the different vowels should be as flat as possible, and projected forward. Great care should be taken not to draw the tongue backward; when drawn backward a mound is formed at the back of the mouth which obstructs the passage of the air, causing a throaty sound, and takes from the tone, power and brilliancy. This fault may be overcome by patient practice before a glass; first drawing in the breath as in gaping, then vocalizing with *ah*, and the vowels *a*, *e*, *i*, *o*, *u*, the end of the tongue at the same time being pressed against the front lower teeth during the production of the tone. A tongue depressor will be found of great benefit. It may be purchased at any place where surgical instruments are sold; an instrument answering every purpose, may be formed, by obtaining a piece of tin, three-quarters of an inch in width, and bending it at right angles, placing one end upon the tongue, and holding on to the other; the part that goes into the mouth should be about two inches in length. The first attempt at using this instrument

will very likely be accompanied by disagreeable sensations, but a little practice and patience will suffice to overcome all difficulties. During the practice, frequently gently raise the tongue depressor, to ascertain if the tongue will remain flat unaided, while continuing to vocalize. By placing the tongue forward, it will facilitate the projecting of the air toward the front teeth, causing the tone to become more powerful and brilliant. Many acquire the bad habit of drawing the tongue backward when singing words in which the *e* is prominent, as, for example, the *e*, as *e* in *bead;* this fault causes the tone to sound throaty, and robs it of brilliancy and purity of quality. It will be found advantageous to sustain all the vowels to each tone of the diatonic scale, the entire compass of the voice, and also the Italian syllables *do — re — mi — fa — sol — la — si — do,* keeping the tongue forward during the sustained sound, and giving *a similar quality of sound to all the tones.* By this it is not meant that the volume should be the same throughout the scale. In every instance, the higher the tone, the less the volume. No fault in pronunciation is more common than that of dwelling upon the final *l* of words ; as, for example, *shall, fall, hall, fail.* While sustaining the *l,* the free transmission of sound is interfered with by the curling of the tongue, thus producing a disagreeable tone. The sound should be sustained upon the first vowel or syllable of a word, and the vanishing part of the word given quickly and promptly. Some persons have the habit of making two syllables out of one, and dwelling upon the last ; for example,

fear, fe-*ar;* sear, se-*ar;* when, wh-*un;* how, how-*oo;* air, a-*er;* where, wher-*er.* With a little care, these peculiarities may be eradicated.

8. Aw, and oo, are the most favorable vowels for the production of sombre tones. In order to produce this quality, the air should be directed towards the back of the mouth. The chin should be kept well back for all sombre tones, and under no circumstances should it ever protrude.

9. The vowels *a*, as *a* in *day*, *a*, as *a* in *arm*, *e*, as *e* in *read*, are the best suited for the production of the clear quality of tone. The sombre and clear qualities give color to the thought, and should be made with different degrees of intensity, corresponding to the different degrees of emotion. The more sombre or sorrowful the thought, the more sombre the quality of tone should be; the more cheerful and brighter the thought, the clearer and brighter the quality of the tone should be. It will thus be seen that the *words* should suggest the *quality.* For example, the words, "*Hark! from the tombs a doleful sound,*" should at once suggest the sombre quality; while the words, "*Joy to the world, the Lord is come!*" should suggest the clear quality. But few singers give sufficient attention to the shading (sombre or clear), of tones. In expression or *style*, much may be gained by giving a variety of coloring to the tones. As all the emotions may be expressed by the face, without the utterance of speech, so may they all be expressed by the colors of tone. In both cases, the story of joy, love, hate, scorn, anguish, remorse and devotion, etc.,

may be expressed, and understood, without the aid of words. Such being the fact, the singer, or speaker, should pay much heed to them. Sacred music, as a rule, should be sung with the sombre timbre, while on the other hand, secular music should usually be sung with the clear timbre; still, in sacred and secular music, both qualities are effectively used. There is scarcely a complete composition of sacred, or secular words, but require both qualities in a greater or less degree. Some voices are naturally full and sombre in quality, hence are *physiologically* adapted to oratorio music; while clearer, brighter voices, are *physiologically* adapted to operatic music. Often this is so marked, that the grandest oratorio singer may fail in opera, and the most brilliant opera singer may fail in oratorio.

10. The vowels most favorable for the culture of the male voice are, A, as a in *art*, EE, as ee in *deed*, O, as o in *don't*, OO, as oo in *doom*, AU, as au in *aught*, and the Italian notation syllables, *do—re—mi—fa—sol—la—si—do*. No one vowel or syllable should be used exclusively for the culture of the voice, male or female, neither should the entire range of the compass be sung without shading; for example, if A, as a in art, be used through the entire compass, without a change of color, the upper tones will become thin, and the voice will eventually become weak and unmusical. The exclusive practice of E would cause the voice to lose volume, and the invariable practice with AU, although it would give fulness, would fail to add strength to the voice. By placing the hand upon the

apex of the larynx, commonly termed Adam's apple, and pronouncing A as *a* in *at*, the larynx will be found to be elevated, while the production of AU as au in aught, will cause a lowering of the larynx; hence it will be observed that for the production of the clear tone, the larynx is raised, and for the production of the sombre tone, the larynx is lowered, and any vowel or syllable that will raise or lower the larynx, will produce these qualities. The elevation or depression of the larynx does not alter the pitch, but changes only the quality. In many cases the larynx is projected too high during singing, thus robbing the tone of volume and musical resonance, as it causes the tone to become throaty. When such is the case, vowels should be temporarily used which will have a tendency to lower the larynx, as AU and OO. If the voice, male or female, is excessively sombre and dull, it will be found of advantage to vocalize with A as *a* in *day*, and A as *a* in *arm*, with the lips made lateral, as in smiling. When the larynx involuntarily remains up, then this practice should be discontinued, or the voice will become thin and useless.

Many exercises and vowels may be used for a purpose, with satisfactory results, as medicine is given to a sick man, but when the end has been accomplished, their use should be discontinued. Peculiar exercises used to attain certain results should be considered only remedial. After all defects have been remedied, then the real culture of the voice should be commenced. The syllable *ah*, shaded into *o* or *oo* on the upper tones, will be found to be the most useful syllables for general

practice for all voices. If the tones are not shaded on the upper part of the voice, they will become thin and screamy. In shading the upper tones, great care should be taken not to make them excessively sombre, otherwise the tones will be so muffled that there will be a loss of power and agility. Shading should be very slight at the beginning of a scale. The very low tones should be sung with *Ah*, as more depth, power and brilliancy is gained with this syllable on these tones, than with the syllable *au*. The male voice, in ascending the scale, should merge the *ah*, into *au* and *oo*. By singing the entire scale with *ah*, and afterwards with *ah–au–oo* combined, the difference between unshaded and shaded tones will be easily observed, the tones produced with *ah* being unshaded, and those combining *ah–au–oo* being shaded. Unless great care is exercised in the production of shaded tones, the larynx will sink to excess. This action would cause hoarseness, and also lessen the power and brilliancy of the tone. By placing the finger upon the larynx, its movements can at once be noticed. It should be borne in mind that volume is not power. A tone should not be so sombre as to lose a telling resonance. In order that a tone may be of good quality, it should have free transmission through the nasal passages. A person having nasal catarrh, will find it impossible to produce clear, resonant sounds, particularly on the upper tones, and the voice will also be diminished in its compass. When this trouble exists, medical aid should be immediately sought. No voice lessons will effect a cure, or enable the singer to overcome the

dulness of the tones. The male and female voice should, and may have, with proper culture, one continuous brilliant resonance from the first tone to the last of its compass, but as the tones ascend, they are apt to become clouded, especially in the male voice. However, the good voice-builder will enable his pupil to overcome this difficulty in a few weeks, unless there is an obstruction, as in the case of catarrhal difficulty. No person can, by reading works on the voice, make himself competent to cultivate his own voice, or the voice of another. It is only by study with a master of vocal culture, that this can be done. Studying the works of prominent masters may prove an aid to the student after previous study, but even then, books are not generally understood. The different modes of presenting a plan for voice culture, the different ideas of what a voice should be, the different schools of vocal culture, the terms used to express the same idea are so varied, that the reader can gain but a slight knowledge of the subject. One writer advocates the culture of many chest tones in the female voice, another a less number; another the culture of falsetto tones in the male voice; another, ignoring the falsetto tones, advocates the culture of the chest tones only. This diversity of opinion is noticed also in regard to the registers of the voice. One writer advances the theory that but one register exists, while another that there are three, and still another that in the female voice there are five or more. This chaotic mass of different views and terms, tends to confuse the searcher after information, and he soon

learns that by the study of books alone, he can never become a teacher or singer. There is but one way to gain vocal culture, and that is, to employ a good teacher, and follow his instruction from the *beginning* to the *end.* Nothing is more detrimental than a constant changing of teachers. It is like reading all these books; the result is confusion, ignorance, and in many cases, ruination of the voice. The different methods of singing should be read, but read understandingly, and this cannot be done until one has familiarized himself with the subject, under careful instruction, at which time some of the works may be read and practiced with great profit.

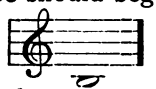
11. The syllable *ah*, *au*, and the vowels *oo*, and *o*, will be found to be the most favorable for the culture of the female voice. The process of cultivating the female voice is quite different from that of the male voice, from the fact that three registers are to be considered, and if either are exaggerated, *ruination of the voice will be inevitable.* On the lowest tones the *ah* will be found to be preferable, the chin being allowed to fall downward and backward; this action causes the larynx to fall lower, hence a more voluminous resonance.

If a full sombre tone is desired, the syllable *au*, or the vowels *oo*, with a vertical position of the lips, will be found favorable for the production of this quality of tone. On the high tones of the voice, it will be found beneficial to allow the *O* to approach the sound of *ah*, with the chin well back, and the upper lip sufficiently raised to show the upper teeth, as in smiling; by this

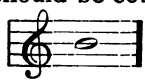
mode, the highest and best tones can be produced in the clear timbre. If the *ah*, as produced on the low, and sometimes on the middle tones of the voice, should be used on C, the third space of the soprano staff, and the same quality continued above, the voice would in a short time become thin and weak.

In singing scales, the shading of the chest tones of the soprano and mezzo-soprano voices, should be commenced on C.

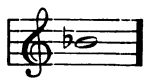
The contralto voice should begin to shade on B.



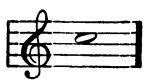
The shading of the tones of the soprano and mezzo-soprano voices, preparatory to their entrance into the head voice, should be commenced on B.



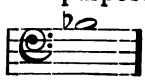
For the same purpose, the contralto should begin to shade on B♭.



The tenor and baritone voices, preparatory to their entrance into the head voice, should begin to shade on C.



The bass, for the same purpose, should begin on B♭.



After the voice has been well placed in the clear timbre, the study of the sombre timbre may with profit be commenced.

There are those who attempt the culture of the voice with the sombre quality. This is a great mistake; the voice can never in this way be made to gain its full strength.

It would be like polishing a piano before the different parts had been put together. No attempt should be made to make the tones voluminous, until the tones have been well located in the clear timbre, and the strength well built up.

The sombre or voluminous tone, should not be used to excess; its excess would impair the execution, and eventually destroy the voice.

12. In cultivating the female voice, it will be found wise to cultivate the medium register first. In the first lessons in vocal culture, the medium or falsetto voice (the terms medium and falsetto being synonymous), should be carried as low as possible. When these tones have become strong, the chest voice should be studied. The medium voice having been made strong, it will be a firm foundation upon which to build the chest tones. By this process, the break between the medium and chest registers will be so slight, that they can be easily united. If the chest tones are first cultivated, the break between the medium and chest voice will be very conspicuous, and there will be much difficulty in uniting the two. Unless special attention is given to the medium tones in the lower part of the voice, they will be weak and almost useless. One

should be able to sing full medium tones from C, the first added line below the soprano staff, to B, the third line of the same staff. A strong medium tone in the lower part of the voice will be found to be very useful.

13. There are few faults more common with beginners in the study of voice culture, than that of producing sounds termed throaty tones. These tones are caused by forcing the chin forward, and drawing up the hyoid bone, and with it, the tongue and larynx. These tones are thin and unmusical. An explanation of the muscles causing this action, will be found under the head of Action of the Laryngeal Muscles, numbers 11, 12, 13.

14. This fault may be remedied by vocalizing with the chin lowered and drawn inward. This will be found to be a somewhat difficult task, but by perseverance and patience this process will entirely eradicate the fault, and the tone will become round, full and resonant. This fault arises from the fact that too much contraction is put upon the muscles passing from above, down to the hyoid bone, thus drawing the hyoid bone upward. When the sterno-hyoid and omo-hyoid muscles (see numbers 11 and 12, *action of the laryngeal muscles*) by contraction, hold the hyoid bone down, (which is the case when the chin is down), then the mylo-hyoid and digastric muscles, which drew up the hyoid bone, draw the chin or lower jaw downward. Until this fault of singing throaty is disposed of, the pupil cannot make any satisfactory improvement.

No teacher can cultivate a voice until all its faults have been eradicated, and the conscientious teacher will labor for this result, and not be induced to pass faults over lightly for the sake of pleasing an impatient pupil. Every teacher should do his work thoroughly as far as he goes. There are pupils who, not pleased with conscientious teaching, change their instructor for one who will pass over the faults, and at once begin the study of singing. There is a vast difference between teaching *vocal culture* and *singing*. Because one is a good singer, pianist, violinist or chorus conductor, it does not follow that he is capable of cultivating a voice. Many such claim to teach vocal culture, and no doubt feel themselves competent, and yet have had no special instruction in this direction. There are those who admirably teach the expression or *style* of an aria, but have not the requisite knowledge to develop a voice. Vocal culture is the building up of the voice, while the study of singing has reference to the *style*, the *expression*, and the *phrasing* of music. If one would have the voice last, earnest attention should be paid first to its culture, the study of singing should come afterwards.

15. Another prominent fault among students of singing, is that of protruding the chin. No person can produce good tones under such conditions. This fault may be remedied by first placing the chin down and back, then singing a tone with a gradual crescendo. Another excellent remedy is to move the chin downward and upward as in mastication, during the production of a tone, endeavoring at the same time to keep

the muscles attached to the jaw relaxed. If these efforts fail, lower the chin, place a strap about it, fastening it at the back of the head, and while in this position vocalize the scales. This is a severe method, but one sure to overcome this pernicious habit.

16. A common fault with singers, is that of singing out of tune. There are several causes for this. One often sings sharp in consequence of nervousness, too much tension being put upon the laryngeal muscles. When such is the case, the vocal cords become excessively tense, and a tone above the pitch desired is the result.

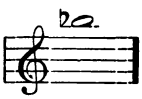
When the nervous system, from any cause, is weakened, one usually sings below the pitch; the nerves supplying the muscles which control the tension of the vocal cords being enfeebled, sufficient tension cannot be given for the requisite pitch. To one who is ill, or continually weak or weary, singing is an impossibility. There are few causes more disastrous or weakening than a bad vocal method. It causes great exertion, resulting in fatigue and depression of the whole nervous system; the voice becomes hoarse, a burning sensation is felt in the throat, the face becomes pale, the body loses weight, and if the method is continued, inflammation of the bronchial tubes sets in, which by degrees is communicated to the lungs, resulting in consumption and death. It is more important for the singer to lead a temperate and peaceful life, than that of any other class of individuals, for that which affects the body or mind detrimentally, has its immediate ill effects upon the vocal

organs. To be in good voice, the mind, as well as the body, must be in a healthy condition. Late hours, excessive smoking, or drinking of stimulating beverages, dissipation or excesses of any kind which can in any way weaken the nervous system, should be avoided by one who would become a good singer, or retain his voice. No teacher can improve the voice of his pupil when the body is enervated by dissipation or disease.

17. When singing out of tune is caused by nervous debility, the pupil requires medical aid; the physician, not the singing master, can perfect a cure. If singing out of tune is caused by dissipation, a return to a healthier mode of life will — unless the vocal organs have been irreparably injured — soon give strength and vigor to the nerves and muscles of the enervated body, enabling one to sing with their usual accuracy of pitch and quality of tone. If the muscles which control the tension of the vocal cords have been strained in the attempt to sing tones beyond the compass of the voice, these muscles need rest, and singing should be discontinued for a time. In the throat organization of some persons, the laryngeal muscles are always weak; singing out of tune is not a positive indication that the ear is defective, all persons, at times, and under certain conditions, are liable to sing out of tune. There are persons who have an excellent ear for music, and who can perceive the slightest discord, still find it impossible to sing accurately an air or a scale of music; this is on account of the laryngeal muscles failing to act in obedience to the will. When the ear is correct, and the laryngeal muscles healthy, one can

always sing in tune. An ear which is incorrect, may be much improved by playing thirds, fifths and octaves on the piano, noticing if they be in tune, or if there be any oscillatory humming sound between the intervals, singing these same intervals, and also the chromatic scale, practicing major and minor intervals, noticing the difference between them, listening to the tuning of the piano-forte, the violin, or any musical instrument; also to voices, noticing if they are in tune. In attempting to increase the compass of the voice, either high or low, but more especially the high tones, great care should be exercised, or the laryngeal muscles will become overtaxed, and never regain their former power. The extreme limits of the voice should never be *practiced.* For example, in order to attain C in alt,

one should not *practice* above A or B♭.

or B♭ 

If the high C is in the voice, by practicing a few tones below this letter, the voice will grow up to it. Even when the high C has been acquired, it should not be brought into daily practice. Its occurrences in arias and cadenzas will give it sufficient practice. The vocal cords are very delicate, and liable to injury when stretched for extremely high tones. What is said of the high tones is true in regard to the low tones, al-

though the low tones are not as susceptible to injury as are the high tones. The natural quality of the voice is due, in a great measure, to the size and action of the epiglottis.

18, 19, 20. The subject of the epiglottis has not been generally much considered in vocal culture. But when its close connection with the production of tone is taken into account, it becomes manifestly a cartilage of real importance to the teacher and singer. The epiglottis is a leaf-shaped cartilaginous plate, located behind the tongue. When the surrounding parts are in a state of repose, the epiglottis stands erect, thus giving free scope to respiration. Its lower part is attached to the protuberance in the throat, termed Pomum Adamæ, or more commonly called Adam's Apple, but anatomically termed the Thyroid cartilage. It has generally been supposed that the entire function of the epiglottis was to act as a valve, to prevent the entrance of solid food or liquids into the glottis,— the vertical opening of the trachea or windpipe; — this is by no means its only important office. In recent experiments which have come under my own observation, it has been found that out of many cases where the epiglottis was nearly, and in some instances entirely cut away from animals, the majority of them experienced no trouble in swallowing; in a few cases, however, a slight difficulty was noticed. It was thus proved beyond a doubt, that to act as a covering for the glottis, for the prevention of the entrance of foreign substances, was not its only function. Often the epiglottis is almost entirely eaten away by disease; but

as in such cases as those referred to, there is sufficient extrinsic muscular action to compress the glottis, and prevent the entrance of food or liquids. An important function of the epiglottis is connected with the voice. The epiglottis, in its relation to the voice, may properly be termed a modifier, and resonator. This cartilaginous plate — the epiglottis — placed at the top of the larynx, acts as does the modifier or tuner, placed at the top of certain flue organ pipes, the tone becoming more brilliant or more sombre by its action. The more erect the epiglottis, the more brilliant the tone, and precisely the same result is obtained by the raising of the modifier or tuner of the flue pipe of the organ. In both cases, the over-tones become less in number, when the epiglottis or modifier is depressed.

In recent experiments with a dissected human larynx, with air forced through the trachea by hydraulic pressure, by imitating the action of the aryteno-epiglottidean muscles, I found the action of the epiglottis referred to, unvaryingly the same as stated above. When the epiglottis was pulled far towards the arytenoid cartilages, the lower tones were subdued, and the higher tones beautiful and flute-like in quality; but as the epiglottis was made more and more erect, the tones became more and more clear, until finally they sounded shrill and disagreeable. In cases where the epiglottis has been eaten partially away by disease, or is by nature short, the quality of the voice is thin and metallic. Another office of the epiglottis is to compensate for a greater air force sent upon the vocal cords. A certain amount of air forced upon an elas-

tic tissue, will produce a tone by causing a certain number of vibrations; now all else being equal, a greater air force would produce more vibrations, hence a higher tone; but the epiglottis comes over the glottis more and more as the blast is increased, thus in a measure, compensating for the extra air force. We say in a measure, for the vocal cords themselves compensate to a great extent for this extra amount of air forced upon them; for as the air force increases, the vocal cords become relaxed, thus admitting of more force without a heightening of the tone, and just in proportion as the blast is increased, the vocal cords become relaxed. Thus we find by repeated experiments, severe tests, and careful laryngoscopic examinations upon many subjects, that an important office of the epiglottis is to act as a modifier and compensator throughout the entire range of the voices; the motor nerves acting in beautiful harmony, and in perfect obedience to the gray matter of the brain.

21. During the production of tone, the false vocal cords also play an important part in modifying the quality of the tone. When they are over the true vocal cords, (the cords by which the tone is produced) they tend to sombre the sound, when back or away from the true vocal cords, the tone is clearer. It will thus be noticed that their action changes the quality of the tone. The false cords are located above and inward from the glottis and true vocal cords, hence the air has not sufficient effect upon them to cause them to produce sound; while the true vocal cords, being located below, and exactly over the trachea or

windpipe, the air easily sets them into vibration, and sound is the result. A theory has been put forward that the tones of the voice are not produced by means of the vocal cords. This is a theory that has not a shadow of reason to rest upon. It is so easily proven to be false, that the wonder is that any person ever presumed to make such a statement. The slightest protuberance upon either of the vocal cords will interfere with speech, and make it impossible to sing; if upon both cords, the voice will be lost.

Dr. Ephraim Cutter of New York city, informed me that he had a case of a school teacher who had lost her voice on account of having warts upon the vocal cords. After making an incision through the thyroid cartilage, he removed the warts, and the teacher regained her voice.

Dr. Frederick I. Knight of Boston, also informed me of a singer who had lost his voice from the same cause, and regained it after warts had been removed from off the vocal cords. Dr. Knight skilfully performed the operation by inserting the knife down the larynx, the throat being illuminated by means of the laryngoscope. After this operation, the person sang with his usual facility.

If an incision be made in the throat *below* the vocal cords, no sound can be produced, if the incision be made *above* the vocal cords, sound is not interfered with. In the first instance, the air passes out before it can come in contact with the vocal cords, hence no sound is produced. In the second case, the air comes in contact with the vocal cords before it passes out,

and sound is the result. By means of the laryngoscope, one may see the cords vibrate during the emission of sound. If the laryngeal nerves which supply the muscles of the larynx be cut or injured, the voice will be destroyed, as the muscles which control the action of the vocal cords then become paralyzed. Beyond any doubt, the vocal cords vibrate according to the laws which regulate the vibration of stretched membranous tongues.

22. It is not always those who practise the greatest number of hours, who make the most progress. Three hours each day is the longest time any person should practise; two hours and a half daily is more judicious. If one is not in the best of health, a much less time should be occupied. There are certain exercises, which, if practised three hours daily, would ruin the voice, although these exercises may be profitable, still, they are too violent for long practice. For example, the sombre tone, the explosive tone, or the staccato, or even breathing exercises, all of which are profitable, and must mastered; still, they are very fatiguing if practised for a long time. One should use much judgment respecting their vocal practice.

23. Fifteen minutes' practice at one time is sufficient; if the exercise be trying, one should practise less time. One should never feel fatigued after practice, but cease before the slightest tendency to exhaustion exhibits itself. One should never practise when ill, or when fatigued from walking, or any bodily exercise. One should never practise immediately after eating. Wait at least an hour. Most persons find it more

advantageous to practise singing two or three hours after rising in the morning, than earlier. Persons troubled with catarrhal difficulty, will find the voice in its best condition in the afternoon or evening. If one studies piano, as well as singing, it will be found of advantage to practise piano and singing exercises alternately, for as one cannot practise singing continuously, the piano practice will give a respite to the voice practice. But practice alone, will not make a singer. In order to sing well, or to practise successfully, one must have the best of food to eat, the best of air to breathe, steady habits, a perfect method, and good health, and with these, combined with talent, and genius, success may be safely predicted.

Resonance.

1. Sounds become more voluminous, and travels farther, when connected with some body capable of receiving, and transmitting the vibrations of air. The more nearly perfect the resonating body, the more nearly perfect and intense the sound. The difference which exists in the qualities of voices, is due principally to the difference in their capacity for resonance, and while every voice may be much improved, still it will have an individuality peculiar to itself. No two voices are just alike, any more than are two faces, or the leaves on the trees. The chief points of resonance of the human voice, are the cavities of the chest, the throat and head. Some cavities receive the vibrations of air direct, others receive them as transmitted from direct points of resonance.

No *one* point of resonance gives to a tone its entire individuality, but all tones are modified by different resounding cavities. All the hollows or recesses of the entire skull and chest are direct, as well as indirect points of vocal resonance; the solid or bony parts serve to receive and transmit the sounds of the voice. The larger the resounding cavities, the more intense and voluminous will be the sound. A large larynx, a

capacious pharynx, wide and long nasal passages, the degree of curvature of the hard palate, all have an influence, and give to the sound the effects peculiar to these cavities. Any obstruction to the full transmission of the air, changes the quality of the sound. As for example, an excessively wide and long epiglottis, enlarged tonsils, a long uvula, the elevation of the middle, or tip of the tongue. Tone is modified by the enlargement or diminution of any organ in the chest, and also by inflammation of the vocal cords, the laryngeal cavity or trachea, also a short epiglottis, or closed nasal passages, caused by a cold or catarrh, the teeth, position of the lips, etc.

2. The fundamental points of resonance, during the production of the low tones of the voice, exist in the cavities of the chest, but receive their principal coloring from the cavities and hard parts of the mouth, the teeth and lips.

3. During the production of the higher tones, the principal resonance is in the cavities of the head, especially in the cavities of the nares. The cavity of the mouth involuntarily changes as the voice ascends. All great soprano artists will be seen to raise and draw the upper lip backward, when attempting to produce the higher tones of the voice; by this means, the resounding passages are more favorable for the production of the high tones of the voice, the tonsils becoming separated and the uvula raised. The attempt to attain the highest tones with a vertical position of the mouth, would result in failure. This position is always accompanied by a sinking of the larynx, which, al-

though it gives more volume, gives less brilliancy, less agility, and less compass to the voice.

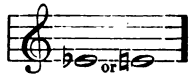
4. A clear quality of tone is best adapted to agility. The larger or fuller the timbre, the less the agility. For example, the contralto has less natural flexibility than the soprano; the bass less than the tenor. In order to gain the clear timbre, the air should be forced forward, and the lips raised and drawn backward, as in smiling. This position causes an elevation of the larynx, and a widening of the distance between the tonsils, both of which aid in the production of this quality of tone.

5. For the production of the sombre tones, the air should be directed toward the back of the mouth, the lips should be in a vertical position. This position has a tendency to sink the larynx, the veil of the palate becomes more arched, and the tonsils approach nearer each other. These different positions are essential for the production of the sombre timbre.

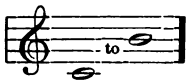
Schools of Vocal Culture.

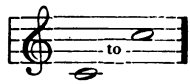
There are three schools of vocal culture, *viz.:* the Italian, German and French. The last is hardly a distinct school, partaking, as it does, largely of the Italian school. The great difference in these three schools, is in regard to the different treatment of the registers, in respect to their compass and volume and extent.

In the Italian school of vocal culture, no particular prominence is given to the chest tones, but the medium and head tones receive especial attention. The voice is made brilliant and flexible, rather than sombre and ponderous. Chest tones are always taught, but not forced to their extreme limits. In this school of vocal culture, there are recognized three registers in the female voice, and the same is true in regard the French and German schools. The French and German schools, however, recognize falsetto tones in the culture of the male voice. These tones, when used successively upon words, sound weak, boyish and unmusical, and are unmeritorious. The chest register of the female voice, in the Italian school, is usually carried to E♮ or E♯.

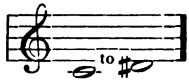


but no violent attempt is made to bring out these tones in the early stages of vocal culture. They are rather permitted to grow out from the medium voice, which is always studied low. When the medium voice or register, has been made strong, it will be found quite easy to produce the chest tones. The medium voice (or falsetto as it is sometimes termed), is carried from C to B, or C to C.

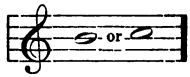




There is a variation of a half a tone in different voices, in this part of the voice. The letters from C to D♯



are studied in both the chest, and medium registers; the singer should use that which is the most suitable for the best interpretation of the words and music. Above the B or C,



the head voice is introduced. In the culture of the male voice, but one register receives special attention, *viz.*, the chest. Male and female voices are educated in the clear timbre. The sombre tones are studied, but merely used as modes of expression, and are not to be used constantly. It is owing to this peculiar

manner of culture, that the Italians retain their voices longer than any other nationality of singers. Voices cultivated in the pure Italian schools, grow better and stronger for years. The study of vocal culture, the method being good, is a physical benefit, while its study, when the method is bad, is injurious in its physical results. It is not because the climate of Italy is more favorable to voices than the climate of America, that they last so long. There is no spot in the United States where the climate is as injurious to voices in winter, as is Milan in Italy. It is the excellent method which gives duration to voices cultivated in Italy. Voices cultivated in the same manner in America, will last just as long.

Many teachers may be found in Boston, New York, and other places in this country, who teach this method as well as it is taught anywhere in the world. No one need go abroad to obtain this mode of vocal culture. It has been thought in former years, to be absolutely necessary to study in Italy, in order to obtain correct vocal culture, and style, and in a measure it was true ; but such an exigency no longer exists. Both culture, and style of singing in oratorio, and opera, may be studied with equal profit in America. At present, a singer hailing from Italy stands no higher in the estimation of musicians, than one hailing from Boston, New York, Cincinnati, or any of the large cities of America. It is merit which gives success. Very many who study in Italy for years, come back to America and make a public *fiasco.* They are seldom heard a second time. The

fact of singing in opera in Italy is no positive criterion of excellence, for in small Italian towns are heard operas very poorly rendered. Singers making their first appearance in opera in Italy, rarely receive any compensation, and in many cases pay for the privilege of appearing. After an appearance, it is an easy matter to obtain the most laudable reports of the singer in the Italian papers. These notices, in many instances, are sent to America and re-published. While some succeed, and all that is said of them is true, still, it is impossible to form an accurate opinion from the statements of the foreign papers. The German mode of vocal culture, is more taxing to the vocal organs, than is the Italian, and voices educated in this vocal school, very soon become impaired. There are many Germans, who, realizing this fact, do not teach the German method. This method aims at fulness of tone. Singers educated in this school possess large, screamy voices. The chest voice is carried high, and made excessively sombre, as are all the tones of the entire compass. This excessive fulness is productive of great fatigue, causing hoarseness, inflammation of the mucous membrane, a burning sensation in the throat, loss of execution, compass, and eventually of voice. More care should be exercised in the choice of a vocal teacher, than that of any teacher in the department of music; for a bad vocal method not only ruins the voice, but impairs the health, sometimes resulting in consumption and death.

Æsthetics.

1. The word æsthetics is derived from the Greek, and is defined, *to feel, or perceive by the senses.* It treats of the science of the beautiful. For more than two thousand years, this subject has been treated in some manner by different philosophers, among whom may be mentioned, Pythagoras, about 580 years B. C.; Socrates, about 471 B. C.; Plato, about 429 B. C., and Aristotle, about 384 B. C. These latter philosophers united the good, with the perception by the senses. About the middle of the last century, Baumgarten, a German philosopher, established it as a separate science, and later on Schiller, and other philosophers, gave to the subject a broader and more practical view, and incorporated into it, *beauty by art,* uniting the *ideal* and *real.* To be æsthetical, is not a matter of the intellect; some of the most intelligent of the human race are not æsthetical. An æsthetical nature is of the soul, intuitive, innate, something that may go out of us and leave its imprint upon mankind. It may be given out in the form of song, poetry, sculpture, architecture, or the landscape. Homer the Greek poet, Michael Angelo the Italian painter, sculptor, and architect; Shakespeare the English dramatist, Beethoven the

German composer, Catalani the famous Italian singer, may all be classed as æsthetical, although variously expressed.

2. There is no person so soulless but he can cultivate, in some degree, an æsthetical nature. Even the Patagonian savage of South America, paints his body to beautify himself, and exhibits an incipient love for music, which is evinced by his amusing himself with his single musical instrument, the fife. The germ of such a nature lies within the soul of every human being. Were it not so, the human race could not have advanced to what it is to-day,—in art, beauty and culture; for all that human intellect has made beautiful about us is an outgrowth of this æsthetical germ, which the human race has been cultivating for ages.

3. An æsthetical nature may be cultivated by teaching one's self to admire all that is beautiful in nature and in art; and by educating the soul to become receptive to the joys and sorrows of mankind. For example: When standing upon the sea-shore, upon a beautiful evening, when the moon is shining in all its resplendent magnificence, and not a sound breaks the stillness, save the gentle rippling of the waves as they come with musical murmurings at our feet, let the soul be brought into harmony and become as peaceful as the lovely scene about us. When from the mountain top we look far out upon the surrounding mountains, and the undulating hills, covered with beautiful foliage, and the verdant valley with nature's variegated hues, let the soul drink in these beauties, and overflow with gratitude for the creation of the

beautiful world which we behold about us. When upon the sea-shore we behold the stormy waves tossed about in maddened fury, and with the noise of an hundred cannon lash the rock-bound coast, let one's whole being become thrilled with feelings of awe at the mighty power of the fathomless ocean. If at the marriage feast, let us join in hearty merriment, if at the bedside of the dying, let us drop a tear of sympathy. It is by bringing one's nature into sympathy with scenes and events like these, that one may cultivate an æsthetical, and emotional nature.

4. A nature thus cultured, moves upon a higher plain of life. He loves mankind better; he loves his God better. A nature thus refined, needs only education to complete the true artist; but without this æsthetical culture, the ideal having been neglected, the real or practical part only will be developed. To become a real artist, one should possess a full, warm nature. Such a nature means sensibility to appreciate, and imagination to create. Possessing these, one has genius, hence is æsthetical; and having a talent for music, after judicious study, one will become an artist in the full sense. A singer or player is an artist, inasmuch as he is able to unite the ideal and real. The composer must possess the ideal in a larger degree than the performer, for he must create; hence must be a genius. The performer must not only also possess genius, but talent as well.

5. The singer has not only the music to inspire him, but the additional stimulus of words. He should fully enter into their meaning, and if artistically ex-

pressed, he will gain the sympathy of his audience, failing in this, he fails in all things. When words are cheerful, the heart should be attuned to joyful emotions, and the facial expression should speak of joy and happiness, and the quality of the tone should be clear and bright.

When words are mournful and sad, the heart should be filled with sorrow, and the face should speak of grief and agony of soul, and the sombre tone should be used to express these deep feelings of the heart.

Hints to Pupils.

1. Get a good teacher and continue with him until you become an artist. Many persons spend time and money fruitlessly on account of constantly changing teachers, the result being that no method is fully mastered, and failure is the consequence.

2. If you would become a singer, you must work patiently and arduously for years. The singing teacher only directs; you must do the work.

3. There are few persons who excel in both oratorio and operatic music; be satisfied to do one well. When you find which you can do the better, make that kind of singing your specialty.

4. When singing, articulate the consonants distinctly, in order that the words may be understood.

5. In order to make your singing effective, pay much attention to the rhythmical accent, also to the emphasizing of important words. Do not emphasize such words as "*for*," "*the*," "*of*," etc. The study of elocution will prove of great value in this connection.

6. Enter into the spirit of the words you sing; every emotion of your soul should be at your command, if you would become an artist.

The study of dramatic action and elocution, is the most effectual means to cultivate the emotions.

7. When singing in mixed choruses, do not change from one part to another. For example, if your voice be baritone, do not attempt to sing tenor; if soprano, do not attempt the contralto part, etc.; these changes are ruinous in their effects upon the voice.

8. To be a good voice or singing teacher, one need not possess a fine voice; brains are needed, not voice. Garcia of London, Eng., is not a singer, but is at present the most celebrated teacher of the voice in the world. Trivulsi of Milan could not speak a word distinctly; yet he was one of the first teachers of the voice and singing in Italy. Lamperti is not a singer, neither is Sangiovani, both of whom are eminent teachers. Because one can sing or play the pianoforte well, it does not follow that he can cultivate a voice.

9. Employ as good a teacher for your first lesson as for your last. It is difficult to eradicate a bad method.

10. Do not attempt to cultivate your own voice. You cannot do it.

11. No matter how talented you may be, never permit yourself to become conceited. Always feel that there will never come a time when there is nothing more for you to learn. Many pupils wreck their musical future upon the rock of conceit. Be willing to commence low down on the musical ladder. If you are worthy of a high place, you will surely attain it.

12. Learn to beat time with your hand; do not

imagine you can keep time by tapping with your fingers or foot.

13. Learn to sing by the Italian syllables, *do, re, mi, fa, sol, la, si, do.*

14. Because you have sung successfully before the public a few times, do not feel that there is no more need for study. There are many off the stage who know much more than many on it.

15. Do not sing in the open air, day or night, more especially at night.

16. After singing in a warm room, cover the throat when you go into the open air. If the weather is cold, place a handkerchief before the mouth when speaking, that the air may become warm before coming in contact with the inside of the throat and inhaled into the lungs, especially if the air be damp. *Do not* wrap up the throat when you go out if you have *not* been singing, unless the air be damp and penetrating. Always breathe through the nose in the open air.

17. In order to sing well, you must be regular in your habits. Indulge in no excesses. Retire early. Singers require a great deal of sleep and quiet. Public singers sleep much during the day. Sleep gives rest to the nerves. The mind, as well as the body, must be at rest, if one would sing well.

18. Never go shopping or calling just before taking a singing lesson. The mind and body will be fatigued, and the lesson will be a failure.

19. When you sing, show by your face and general ɔrtment that you are interested in what you are

singing. Make the sentiments of the song a part of yourself, for the time.

20. It is better to stand when practising vocal exercises; one can place the tone better, breathe better, and execute better.

21. If one has not heart enough to sing a ballad well, he can sing nothing well.

22. In order to sing well before the public, much experience is required; hence improve every opportunity of singing publicly; remuneration is of secondary importance for the first year or two.

23. If you find yourself in a fair voice, do not take any medicinal preparation to improve it; a constant use of throat stimulants will weaken the vocal organs.

24. Do not be continually clearing the throat. The more you do so, the more irritated the throat will become. In a great measure this is a habit.

25. Never sing in public until you have thoroughly rehearsed your song with the accompanist. Remember all good players are not good accompanists. Have your song nearly, or quite committed to memory. Do not hold the music before your face. Do not hold the music open. Be careful in your selection of a piece to sing; a poor selection is sometimes the cause of a failure.

26. Never be jealous of other singers. Always speak kindly of them, or say nothing.

27. Attend every good concert, and notice the expression or style of each number on the programme, whether it be vocal or instrumental, that your own style may be improved. The greatest artists learn

from each other in this way. No one can ever cease improving in this respect.

28. Never suggest to your teacher the course of instruction you wish him to pursue with you. Neither take the liberty of selecting your own music. If he is capable of being your teacher he is competent to arrange your course of instruction, and the best judge of what music you should sing.

29. Do not allow anything to touch the throat externally when you sing. It impedes execution and power.

30. Do not sing with the piano against the wall.

31. Avoid singing in rooms crowded with furniture and draperies; such rooms deaden the vibrations of the voice, and cause great fatigue of the vocal organs.

32. Do not give too much force to the voice when singing; by doing so you will be apt to sharp, and produce a shrill, thin tone; the vocal cords will be liable to strike together, causing the voice to break.

33. When smoking causes expectoration, it dries the pharynx and throat, therefore it impairs the voice.

34. Do not attempt to *cultivate* a voice until it has completely settled; however, the study of the *rudiments* should be commenced in childhood, as early as six years of age. At this age, care should be taken not to fatigue the mind of the child; but as the pupil grows older, more may be given, as more can be received.

35. Practise vocal exercises some every day, or the voice will lose its quality and flexibility.

36. As a singer, you should know something of the Italian language.

37. If the words of your song do not *require* any variety of expression, still, it is better to introduce *some variation* for the sake of breaking up its monotony.

38. Before singing a song, read over the words carefully, that you may give the proper expression to them.

39. In preparing yourself to become a singing teacher, or singer, the study of the piano-forte and harmony are absolutely essential.

40. When you sing in public, stand near the front of the platform; have the piano placed near where you are to stand.

41. Do not attempt to learn a new song every time you sing in public. The old tried friends are the most reliable. If you find a certain song successful, sing it often, in different places.

42. If you join a company of singers, whether it be as a soloist or chorus singer, never speak slightingly in any respect of any member of the organization.

43. Do not be flattered by newspaper praise. It is often the object of the critic to please, rather than to criticise. Consider carefully the *severe* criticisms; they may prove of great value to you.

44. If you would have your audience impressed with your song, first become impressed with it yourself. We sometimes listen to an excellent composition which fails to touch a fibre of our being; it is because there is no concord between the performer

and the spirit of the composition. The listener never feels that which is not in the heart of the one he listens to. If nothing is given, nothing can be received. There must be a chain of sympathy between the performer and the listener, otherwise all will fall lifeless upon the air. It is as true in music as in everything else, "Whatsoever a man soweth, that shall he also reap." Many persons who sing, fail to express music properly, for the reason that they lack the requisite methodical knowledge upon the subject of expression. Lacking in this, they sing with much affectation, using to excess the tremulo, singing with a shout here, and a murmur there, ranting, and tearing a passion to pieces, with no scientific regard to the interpretation of the music or poetry. The *attempt* to give expression, although crude and excessive, is an evidence that the germ of the musician is within the soul, and that the mind only needs culture, when the heart will respond truthfully to the genuine sentiment of the composition. In the aim of the student to give expression to music, he should use much care not to go beyond what is required, or it will degenerate into mere sentimentality, or dash out into ridiculous rant. The speech of Hamlet to the player is equally applicable: "O'erstep not the modesty of nature, for anything so overdone is from the purpose of playing, whose end, both at first and now, was, and is, to hold, as it were, the mirror up to nature." This rant, this boisterous over-gushing, this tremulous sentimental singing, is very common among young singers, and should be strictly guarded against. The heart should be

thoroughly imbued with the sentiment of the composition; but it should be kept completely under control. Again, Hamlet says: "For in the very torrent, tempest, and (as I may say) whirlwind of your passion, you must acquire and beget a temperance that may give it smoothness."

Medicinal.

For a Weak, or Sore Throat.

Dissolve one tablespoonful of pure table salt in about half a tumbler full of water, gargle the throat thoroughly, morning, noon, and night, before each meal. After the throat has become strong, use it regularly every morning. This frequent use of it will keep the throat strong, and act as a preventive from colds.

For a Tickling Cough, and Cold upon the Lungs.

Dose.—*Dracontium sem*, two, pulverized, taken in a table-spoonful of ordinary molasses, morning and night. Also, rub the chest and throat vigorously with *volatile liniment.*

To Break up a Cold in the Head.

Sweet spirits of nitre, eight teaspoonfuls; tincture of aconite root, four drops; and tincture of belladonna, four drops. Mix.

Dose.—One teaspoonful in a table-spoonful of water, every hour.

This is also good for any ordinary cold.

For Hoarseness.

Dissolve a small piece of crystal borax in the mouth.

For a Cold in the Head.

One table-spoonful of spirits of camphor to half a pint of *hot* water; *inhale the fumes. Not to be taken internally.*

To strengthen the vocal cords a spray must be used; a gargle does not touch the vocal cords. The following will be found to be an excellent spray prescription for stimulating the vocal cords: —

Sulphate of iron and ammonia, dissolved, thirty grains; water, two ounces. Mix.

Put the liquid into an atomizer, which can be procured at any druggist's. Place the tube well back into the mouth, pronounce the letter *a*, as a in *at;* at the same moment the *a* is being pronounced, press the bulb of the atomizer, and the spray will pass down upon the vocal cords; use three times a day.

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